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A STUDY OF ACTIVITY PARTICIPATION AND SOCIAL INTERACTION IN MODERATELY MENTALLY HANDICAPPED CHILDREN IN A SEGREGATED AND INTEGRATED FREE PLAY PROGRAM

by

(C) JULIE ANNE TITUS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF ARTS

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Date May 28, 1985

Dedication

It is only with the heart that one can see rightly;
what is essential is invisible to the eye."

Antoine de Saint Exupery, Le Petit Prince.

Dedicated to the memory of my grandfather, C. B. Thompson, who was my source of inspiration.

Abstract

As increasing numbers of mentally handicapped children are brought into the mainstream of education, teachers are faced with the problems of providing instruction in physical activity for all students within an integrated environment. In physical activity the rationale for integration is based on the assumption that including mentally handicapped children in regular activity programs will provide them with access to a broader range of activities, opportunities and experiences than would be available to them in segregated programs. Based on this assumption, benefits are expected to accrue in the areas of motor performance, social interactions, attitudes of others toward the handicapped and improved self-concept of the handicapped.

Unfortunately there has been widespread implementation of integration in physical activity programs without evaluation of the outcomes. Virtually no data-based literature has been reported addressing variables related to physical activity outcomes.

The purpose of this study was to examine the behavior of moderately mentally handicapped children, aged 5 to 10 years, in order to determine if they benefit from placement in physical activity programs with nonhandicapped children. Socialization, activity participation, equipment preference and level of use were the dependent variables examined. The presence or absence of play vehicles was also investigated to determine whether this would further affect behavior. An alternating conditions design was implemented across a period of 20 sessions and data were collected during unstructured free play each session.

Results from this study showed no group trend, therefore generally do not support the assumption that exposure to integrated programming will increase activity participation or social interaction. The fact that the data do not show consistent negative outcomes is, in and of itself, a positive finding since it indicated that there is some degree of playmate tolerance occurring.

Activity participation did not appear to be affected by the presence of play vehicles in the environment. However, significant negative effects on social interaction levels in all

subjects were found under this condition. Differences in levels of equipment use and equipment preference between the handicapped and nonhandicapped subjects were found.

In light of these findings, implications for integrated play environments in regards to structure and equipment use are discussed.

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Chapter I

Introduction

The Problem

Rarely does one question the importance of physical activity in the lives of healthy children (Rarick & McQuillan, 1977). Children are able to achieve some degree of physical fitness through active participation in games, sports and play activities. Play is a natural source for development of fundamental motor skills, a medium for demonstrating competence of learned tasks, and is intrinsically satisfying to the young child. The exercise obtained from play activities aids in normal growth and increases motor activity (Bailey, 1976). In the past, little has been done to improve physical activity in the young mentally handicapped population. Generally speaking, this is due to the "lack of understanding of the importance of physical activity in the lives of these children; inadequate knowledge of how to meet their physical activity needs, and the shortage of teachers capable of planning and conducting physical activity programs for them" (Rarick & McQuillan, 1977, p. 2). This is unfortunate since it is an area in which the mentally handicapped are capable of achieving. It is important that mentally handicapped children experience success in activity since they are so often frustrated academically (Soloman & Pangle, 1967).

Research on integration in the classroom abounds, though there is a paucity of data-based literature in regard to integration in physical activity. Owing to this fact, the rationale for integration in physical activity reflects similar principles to those put forth for mainstreaming in education. It must be noted that these assumptions are only speculative in nature and further research is needed to determine their validity.

It is presumed that including mentally handicapped children in physical activity classes will provide them with access to a broader range of activities, opportunities and experiences than is available to them in segregated programs. It is also assumed that in regular physical activity environments, expectations will be higher and teachers will be more knowledgeable

about their sport or activity. It is believed that with the opportunity to interact with and observe nonhandicapped children, the handicapped will be able to obtain higher levels of achievement in the cognitive, social, emotional and motor domains. Further, it is hypothesized that exposure to handicapped children will reduce negative attitudes held by nonhandicapped peers, parents and teachers toward the handicapped. This will in turn lead to an increase in sensitivity to a wide range of individual differences. Social acceptance and tolerance of the handicapped by the nonhandicapped is presumed to lead to higher self-concepts in the handicapped (Watkinson & Titus, 1985).

Four key benefits from integration in physical activity are expected to accrue. These are: improved motor performance of the handicapped; improved social interaction between the handicapped and nonhandicapped; positive attitudinal changes in the nonhandicapped; and improved self-concept in the handicapped (Watkinson & Titus, 1985). Some of these benefits may be realized through intelligently structured integrated activity programs which may feasibly accommodate previously excluded mentally handicapped children (Bricker, 1978).

Unfortunately, there has been widespread implementation of integration in physical activity without knowledge of prior related research or without evaluation of the outcomes. This practice may lead to replication of past failures and result in a waste of valuable time and resources (Bricker, 1978).

One major area of research lacking attention is the study of young moderately mentally handicapped children. The feasibility of integrating moderately and severely mentally handicapped children poses some complex problems. This is primarily due to the additional resources these children require to enable them to function more effectively in regular programs, as well as the special teacher training necessary (Fredericks, Baldwin, Grove, Moore, Riggs and Lyons, 1978). These problems may be less evident, however, with a group of moderately mentally handicapped, as opposed to the severely handicapped, and when integrated into an activity program only, rather than a full day program. There is some indication, from the preschool literature, that suggests that moderately and severely handicapped children can be

successfully integrated into play programs, when structured activities are provided (Fredericks et al., 1978).

Statement of the Problem

The purpose of this study was to examine the behavior of moderately mentally handicapped children, aged 5 to 10 years, in order to determine if they benefit from placement in physical activity programs with nonhandicapped children. Before methods to structure successful and beneficial integration can be established, it is important to determine what differences, if any, exist between integrated and segregated settings with this population.

The initial question asked was whether mentally handicapped children benefit differentially, when placed in segregated and integrated activity programs in terms of their; a) physical activity, and b) social interaction. A second related question was whether the presence or absence of play vehicles, in these two settings, would further affect behavior.

The third question addressed was whether differences exist in level of activity and equipment preference between handicapped and nonhandicapped children, given the same environment.

The descriptive data on social and physical participation in activity provides an initial basis for evaluating integration in physical activity programs at this age. The data on equipment preference and use will provide valuable information on whether nonhandicapped and handicapped children have similar patterns of play when participating in the same environment, and will contribute to an understanding of these factors as they affect integration.

Delimitations

This study was conducted in the PREP playroom at the University of Alberta. This environment was familiar to all the program participants. The mentally handicapped participants were from two intact special classrooms from the Edmonton Public School System. The mentally handicapped subjects were subsequently selected from this group. The

nonhandicapped subjects were selected from a local daycare facility and participated in the study as a group. The environment during the integrated sessions consisted of approximately equivalent numbers of handicapped and nonhandicapped children.

Limitations

Subjects for this study were chosen from intact classroom groups and therefore, no random selection or assignment occurred. It may not be assumed then that results from this research study necessarily generalize to other subjects outside of the chosen research population. Descriptive data on the subjects, however, lend credence to an assumption that these are representative students, typical of such students in public schools in Edmonton. Equal numbers of children were used for the purposes of the study although it is recognized that integration in the school system is not realistically implemented with a ratio of this type.

The use of videotape cameras with fixed ranges of view plus certain structural barriers in the playroom, caused occasional obstructions in viewing the children's activities, especially at the periphery of the room. The results presented here reflect the best estimate of observable behavior.

The OS-3 recording device used in Study 1, was primarily designed for recording specific stimulus response events. Owing to the original focus of the study, it was concluded that there were too many possible combinations of variable events to record. Subsequently, a duration estimate was chosen to obtain an overall general representation of behavior patterns. The OS-3 had mechanical limitations, in terms of the number of duration toggle switches available, therefore it was only possible to use a limited number of categories.

Chapter II

Review of Literature

In the literature encompassing facets of integration, three terms are predominant, specifically; normalization, mainstreaming, and integration. These terms are, on occasion, used interchangeably. Broad definitions of each shall be given for purposes of clarity. Wolfensberger (1972) reformulized the Scandanavian principle of normalization, which emerged around 1969. He refined the concept as a "utilization of means which are as culturally normative as possible in order to establish and/or maintain personal behaviors and characteristics which are as culturally normative as possible" (p. 28). From this, the terms integration and mainstreaming evolved. Mainstreaming is associated with maintaining a handicapped child in a normal setting but at the same time providing the support or special education that may be necessary (Fredericks et al., 1978). The word *mainstreaming* was coined to emphasize the instruction of special needs children in the mainstream of society, as opposed to educating special children outside the regular school, in institutions or sometimes not at all, as had been previous practice (Meisels, 1977).

Integration may be viewed as "the opposite of segregation; and the process of integration as consisting of those practices and measures which maximize a person's (potential) participation in the mainstream of his culture" (Wolfensberger, 1972, p. 47). Integration usually implies that the handicapped child is primarily involved in a special education environment, but participates together with nonhandicapped children in certain activities (Fredericks et al., 1978). These special classrooms are housed in, and under the auspices of, a regular school. Integration occurs in two ways: either bringing the handicapped children into the nonhandicapped children's environment or program, or vice versa. The latter is termed reverse integration. Reverse integration is normally associated with the severely handicapped. Since severely handicapped children function at low levels, and it is often necessary to focus on their basic needs, regular mainstreaming is usually not beneficial to either handicapped or nonhandicapped children. Depriving the severely, handicapped children of outside social

contact however, is not conducive to the principle of normalization. Therefore with reverse integration a two way educational learning process can still be introduced (Poorman, 1980).

Normalization, mainstreaming, or integration, regardless of the term, is only meaningful if it involves social integration. That is, it must include social interaction and acceptance and not simply physical presence (Wolfensberger, 1972).

Integration in Physical Activity

As previously mentioned, relatively few studies can be found with regard to integration in physical activity. The research findings that follow discuss motor development and play characteristics in the mentally handicapped in comparison to nonhandicapped children. This information is essential in order to develop an understanding of the important role that physical activity plays in the lives of mentally handicapped children and the potential benefits that integrated programs may offer.

It appears that handicapped children follow a similar pattern of motor development to that of nonhandicapped children. Development of motor skills in children is thought to be sequential and hierarchical. Handicapped children seem to follow this process, although they lag behind their nonhandicapped peers in attaining developmental stages (Watkinson & Wall, 1982).

Field, Roseman, DeStefano and Koewler (1982) recently conducted a cross-sectional study using four groups of children, from nonhandicapped to severely handicapped. The purpose was to determine whether handicapped children do, in fact, follow a normal sensorimotor developmental sequence, that being an initial focus on parents or other adults, followed by toys, and then peers. Suggestions of a developmental sequence were found. The children with greater developmental maturity showed less self-directed and more peer-directed behavior. All groups showed a similar amount of behavior directed toward the teacher. The nonhandicapped and mildly handicapped were involved with more toy directed behavior than either of the two lower developmental groups. The mildly handicapped children exhibited

approximately the same amount of toy directed behavior as the nonhandicapped, but less peer directed behavior.

Although the mentally handicapped appear to follow similar developmental patterns as nonhandicapped children, there are distinct differences in their play characteristics. It is evident from observational studies of free play that mentally handicapped children spend little time in play activity and when they do play they use their time inefficiently. Mentally handicapped children lack both range and depth in their skills (Watkinson & Wall, 1982).

For example, results from a study of moderately mentally handicapped children completed by Wall (1977) revealed a wide variety of individual differences in free play. One salient finding of note was that 6 of 14 children were inactive or onlookers for at least 33% of their free play time. Watkinson (1977) conducted a study with young moderately handicapped children and results from a pretest indicated that these children spent approximately 57% of their free play time in non-play or prerequisite play skills (e.g. walking, crawling, holding objects).

Linford, Jeanrenaud, Karlsson and Witt (1971) conducted a study to determine play characteristics of Down's Syndrome and nonhandicapped preschool children. Nonhandicapped children exhibited a greater amount of movement both in speed and frequency of movement. Down's Syndrome children made greater use of less complex free space and spent less time on play apparatus than the nonhandicapped children. It is apparent from this study from a physical fitness perspective, that in terms of vigorousness of movement and energy expenditure, that handicapped children would require a much longer play period to receive the same benefits as the nonhandicapped children.

It is apparent that mentally handicapped children are deficient in their motor performance (Wall, 1975). A number of reasons for the handicapped child's lack of play skills have been suggested by various researchers (e.g. Benoit, 1955; Wall, 1977; Watkinson & Wall, 1982). These include: limited availability of appropriate equipment, overprotectiveness of parents and teachers, inefficient use of practice, lack of opportunity and time, limited exposure

to appropriate models, limited cognitive capacity or skill and a deficit in motivation. All of these factors are somewhat interdependent and lead to inferior motor skills and less active participation.

It becomes a vicious circle for young mentally handicapped children who lack the skill to use their play time effectively and constructively. Play time is not used for skill practice, which results in further skill deficit in comparison to average nonhandicapped children's skill development. In summary, the typical play pattern of the mentally handicapped child is characterized by a lack of vigorousness in movement, lack of opportunity to play, lack of appropriate play skill, lack of appropriate social skills for group play and a wide range of individual differences in all of the above.

A physical activity environment offers many potential benefits for facilitation of integration, in terms of observing skilled models. The medium of free play is less constrained and models are more conspicuous than in the classroom. Children provide the best insight to other children, both handicapped and nonhandicapped, into how to play. Therefore ideally, they are also the best teachers. It is extremely difficult, if not impossible, for an adult to conceivably idealize the variety and depth of a child's play. Therefore an instructor would be able to offer, at best, only a limited repertoire of activities when teaching the young handicapped child in a segregated environment. Bricker and Bricker (cited in Guralnick, 1976) sum up the importance of child-child interactions in integrated play.

> The ways in which a non-delayed child plays with toys and other objects in the classroom and playground provide greater variation in the types of activity available than the more limited repertoires of the delayed youngsters. This modeling of object-relevent play may provide a better instructional medium than a teacher demonstrating the same activity directly, since both approximations to relevent use and greater variations in the use of objects are evident in the play behavior of the non-delayed child (p. 237).

These same environmental factors that provide a conducive environment for peer imitation may also prove to be detrimental factors to the integrative process for the handicapped child. Since physical activity performance is overt in nature, incompetence may be easily detectable. Watkinson and Titus (1985) propose that the critical factor in successful integration with the mentally handicapped may be competence. In most physical activity programs it is usually the more highly skilled performers that determine the pace of the activity. With the persistence of competition as a cultural norm, group success becomes dependent on the performance of the lower skilled participants. Mentally handicapped children must be provided with the necessary skills to enable them to be on more equivalent levels, motorically, with their nonhandicapped peers. This is of critical importance in physical activity. It is therefore imperative that the mentally handicapped child receive structured and progressive practice time to allow him or her the opportunity to learn or upgrade, and subsequently use, motor skills in free play environments (Li, 1981; Wall, 1977; Watkinson & Wall, 1982).

Data-based literature investigating competence in physical activity is scarce. One related study completed by Auxter (1970) reveals that EMH grade 5 students were capable of making gains in a developmental motor fitness training program. All children worked through fitness stations, each following their own individually prescribed instructional program (IPI). Although no significant fitness outcomes were evident, probably due to the limited time span of this study, Auxter felt that the IPI allowed for successful integration of EMH and nonhandicapped students. At the same time, the environment provided the opportunity for optimal development of each student.

Using an alternative method, such as station activities and individualized programming, circumvents many problems associated with overt demonstration of incompetence that may occur in other type of activities (for example, team sports). In numerous physical activities in school curricula however, these types of alternatives are not possible. In integrated activity programs, the handicapped students are expected to participate in the same activities as nonhandicapped students. Some of these activities are vigorous and complex, in accordance

with the nature of physical activity. The effects of the many related variables, that will facilitate competent skill performance in physical activity, must be reduced to minimum levels.

Rationale for Mainstreaming in Education

Within the past decade, the principles of normalization, mainstreaming and integration have gained widespread acceptance, especially in educational settings. Prior to this, general services were often denied to special populations because it was thought that; a) generic agencies did not have the necessary specialized skills and resources, therefore special populations would be better served by special services, and b) certain deviant individuals should be segregated from the mainstream of society, even if they are not always served expertly (Wolfensberger, 1972).

The current enthusiasm for integration reflects changing perspectives of society toward the handicapped. The move toward integration in early childhood is an extension of the effort to mainstream older children into the educational system (Guralnick, 1976). "The thoughtful integration of the handicapped and nonhandicapped child may be a strategy that will ultimately assist in changing societal attitudes toward the handicapped child, modifying the handicapped child's self-perceptions, eliminating deleterious effects of segregation, and developing more effective use of the nation's educational resources" (Bricker, 1978, p. 11)

There are a number of events in education that have been credited for the shift toward mainstreaming. These are: legal rights for services for handicapped children (Apolloni & Cooke, 1978; Corman & Gottlieb, 1978), disenchantment with the efficacy studies in special classes (Apolloni & Cooke, 1978; Corman & Gottlieb, 1978), growing philosophical commitment to the principle of normalization and financial support for such services (Apolloni & Cooke, 1978), and progress in the development of individualized curricula by general educators (Corman & Gottlieb, 1978).

The perceived benefits of integration are usually based on social/ethical, legal, and psychological/educational arguments. Social/ethical views propose that integration will alter

societal attitudes toward the handicapped, reduce the negative effects of segregation such as isolation and prejudice, enable a more efficient allocation of resources for both the handicapped and the nonhandicapped, as well as increase the potential contribution of handicapped individuals to society at large (Bricker, 1978; Meisels, 1977).

Legal justification, at least in the United States, involves the right of all handicapped individuals to a free public education in the least restrictive and yet productive educational setting (Bricker, 1978; Meisels, 1977) and the guarantee of due process for parents to exercise the right to be involved with and question decisions regarding their handicapped children (Benoit, 1955; Bricker, 1978).

Many psychological and educational benefits are expected to accrue from integration. Both exposure to, and having the opportunity for observation of, nonhandicapped children, is expected to benefit the handicapped. In integrated settings, expectations are higher and children may be pressed to expand on their abilities (Bricker, 1978; Guralnick, 1976; Meisels, 1977; Snyder, Apolloni & Cooke, 1977). It is also hypothesized that there will be an increased sensitivity to individual differences by peers, parents and teachers (Guralnick, 1976; Snyder et al., 1977) and that training will provide the handicapped child with the appropriate processes (e.g. selective imitation of appropriate behavior) to adapt to novel situations (Snyder et al., 1977). A further assumption is that teachers may also benefit from the opportunity to observe a diverse group of children and thereby be able to gauge child behaviors in a developmental context (Guralnick, 1976). Apolloni and Cooke (1977) suggest that:

> when handicapped children are accepted by and interact with their nonhandicapped classmates, more structured forms of teaching between children can readily be organized as well, by providing them with opportunities to develop sensitive and well formed informal feelings of acceptance for human diversity (p. 159).

Conversely, Gresham (1982) feels that at least some of the assumptions behind the push for integration are erroneous, in particular, those that suggest that placement of

handicapped and nonhandicapped children together will increase social interaction and acceptance of the handicapped, and that the handicapped will model appropriate behavior as a result of exposure to the nonhandicapped. In reviewing the studies investigating the social processes and integration, Gresham pointed out that these assumptions are not substantiated by research. He suggests that in actuality, many traditional classrooms are not appropriately structured to include handicapped children in active participation and enable them to imitate appropriate social behavior.

Why is mainstreaming so controversial? Meisels (1977) suggests that the main areas of concern are questions regarding whether the handicapped will get an appropriate educational experience, whether the nonhandicapped will get sufficient attention, whether the teachers will be provided with the critical inservice and support, and whether the educational system will be able to absorb the radical changes imposed through mainstreaming.

Often, the controversy regarding mainstreaming centres around a concern that the nonhandicapped children will suffer academic disadvantages. A year long study by Odom, Deklyen and Jenkins (1984) revealed that the academic performance of nonhandicapped preschoolers who were placed in classes where the majority of children were handicapped, did not differ significantly from the performance of children in a control group assigned to preschools involving only nonhandicapped children. Other studies, to be outlined later, also tend to indicate that in a variety of social contexts nonhandicapped children do not suffer. There is still confusing evidence from research attempting to discern whether handicapped children do actually benefit as hypothesized.

Reid (1970) postulates that there are five basic principles inherent in the definition of mainstreaming. These are:

1. each individual case must be considered separately in regard to mainstreaming,
2. the process of mainstreaming should follow a diagnostic prescriptive approach,
3. mainstreaming implies a changing role for the special educator or teacher of adapted physical education, whereby he or she would take on the role as an individual tutor

or resource consultant to other teachers in establishing individualized programs,

4. successful mainstreaming may entail a positive change in attitude for teachers and students towards the handicapped,

5. all students must be served in the least restrictive environment possible.

If these tenets are given careful consideration, the process of mainstreaming should become more efficient and effective and the concern over unequal benefits from programming may be minimized.

Studies of Social Integration

Parten's (1932) classic work on social participation among preschool children initiated a relentless trend toward the study of social behavior in children. She defined six social behavioral categories from 'unoccupied' to 'cooperative or organized supplementary play'. Her findings revealed that average preschool children participated more frequently in parallel, associative and cooperative social play and less frequently in unoccupied, solitary or onlooker play behavior. It is well documented that play is an important vehicle for cognitive, emotional, as well as social development of the young child (Benoit, 1955; Hartup, 1978; Watkinson & Wall, 1982) and that normal human development depends partially upon peer interactions that occur during early childhood (Nordquist, 1978). "Peer relations occupy a central position in a child's development. Adequate peer relations contribute to the acquisition of basic social and communicative skills in a manner that interactions with adults either cannot or will not produce" (Hartup, 1978, p. 31).

This is a central issue, particularly for handicapped children, who are more often dealt with in segregated settings and where the primary source of interactive communication for these children will come from teachers or other adults. Integration will provide the more appropriate and productive source of interaction, that is, child-child interaction.

Since the 1970's, the social behavior of children in integrated programs has become of great interest to researchers. There have been a myriad of studies investigating the socialization

process between handicapped and nonhandicapped children in integrated environments using the medium of free play.

The results of these studies are somewhat conflicting and confusing to interpret. Guralnick (1981a) outlines the problems inherent in efficacy studies of integrating handicapped children in early childhood education settings. For practical reasons, it is difficult to control for variables such as curriculum, teacher training, staffing patterns, subject selection and assignment, among other factors in these types of studies. Therefore it not only makes the validity of individual studies investigating integration questionable, but also the generalizability and comparison across studies.

Some researchers advocate that young handicapped children benefit from integrated environments in terms of reducing social deficits and producing more pro-social and child-directed behavior and less teacher initiated behavior (Field, Roseman, DeStefano & Koewler, 1982; Ispa, 1981; Ispa & Matz, 1978; Novak, Olley & Kearney, 1980). Other researchers agree that social integration can occur between the handicapped and the nonhandicapped, though there also appears to be a trend of peer preference on the part of the nonhandicapped. Nonhandicapped children tend to choose other nonhandicapped children more consistently as playmates (Guralnick, 1980; Peterson, 1982; Peterson & Haralick, 1977; Porter, Ramsey, Tremblay, Iaccobo & Crawley, 1978). This becomes particularly evident for social organization involving more complex play (Peterson & Haralick, 1977). Cavallaro and Porter (1980) found that physical mainstreaming alone did not result in complete social integration and that both nonhandicapped and developmentally delayed children often select playmates, in both free play and game playing situations, whose cognitive functioning level approximated their own.

Santomeier and Kopczuk (1981) found corroborating evidence with grade seven trainable mentally handicapped (TMH) and nonhandicapped students in a physical activity setting. Merely pairing TMH students with nonhandicapped students did not ensure social interaction. Pairing students in combination with teacher praise for social interaction to either

the handicapped or the nonhandicapped however, proved to be an effective method of increasing social interaction between the two groups.

Guralnick (1981b) on the other hand, found an equal amount of social communication directed to and received from each of four different groups of children distinguished developmentally from nonhandicapped to severely handicapped. There was some suggestion of social isolation, but no direct rejection, of the least advanced children. Also it was clear that the higher functioning children suffered no detrimental effects from association with the moderately and severely handicapped children, and they in turn, benefitted from integration by reducing inappropriate play behavior.

Strichart and Gottlieb (1975) have reported findings of a linear relationship between degree of competence and amount of peer imitation. Educable mentally handicapped children were portrayed as being good, moderate or poor models for nonhandicapped children, in completing a manual dexterity task. As the level of competence increased, the amount of imitative behavior by the nonhandicapped correspondingly increased. It was found that, resultant from this task, choice of playmates was influenced. Competent handicapped children were chosen by nonhandicapped children as partners for a new task apparently requiring similar abilities, but the handicapped child did not necessarily have to demonstrate competence on the new task. This may exemplify the potential generalizability of the effects of competence. "To the extent that being imitated by one's peers represents a high prestige value for children, it appears that the level of competence manifested by a child, and not the label attached to him, is the critical determinant of his social worth in interpersonal situations" (Strichart & Gottlieb, 1975, p. 511). The authors therefore suggest that providing handicapped children with skills that enable them to function at more equal levels to those of their nonhandicapped classmates may increase their social acceptability.

Aloia, Beaver and Pettus (1982) substantiated Strichart and Gottlieb's results in their study of perceived competence in a game playing situation. Children, in grade 7 and 8, observed two pairs of students they were told were about to begin playing a bean bag game. An

experimental pair involved one educable mentally handicapped (EMH) student and one nonhandicapped student and a control pair involved two nonhandicapped students. In both instances the pairs were matched for grade and sex, and in the case of the control pair, both students were from a different school district and therefore unfamiliar. Nonhandicapped subjects were asked to select one member from the pair to play with to win the game, either as an opponent or a partner (two ways to win the game were possible). The paired students abilities were disclosed to the subjects by way of a 'report' which was under experimental control such that both students in the pair had equal ability, or either one or the other student had superior ability. Results indicated that the selection of partners or opponents was based on level of competency, and a control pair member (unfamiliar student) was more often selected. The more competent a member was perceived to be, the less likely he or she would be selected as an opponent. Different selection rates were observed in that the EMH member was more likely to be selected as an opponent than the nonhandicapped member. Aloia and his colleagues infer, from these results, that it may be possible to facilitate initial interactions between the EMH and the nonhandicapped by increasing the competency of the handicapped and by providing alternative possibilities for the occurrence of interaction. Once this initial step has been made it may, in turn, increase the likelihood of further interaction.

There has been a suggestion by some researchers that the reason the handicapped fail to show consistent playmate preference is their inability to discriminate (Cavallaro & Porter, 1980; Guralnick, 1980; Porter et al., 1978). Further, the fact that nonhandicapped children tend to selectively choose other nonhandicapped children for playmates may be due to some extent, to their avoidance of the dissimilar, in this case handicapped peers (Porter et al., 1978).

This notion of the dissimilar may be further extended to physical appearance. Siperstein and Gottlieb (1977) found evidence with fourth and fifth grade children to suggest that "physical stigmata are sufficiently salient in children's perceptions that they cannot easily dismiss them when they evaluate others"(p. 459). Even a child who performed competently, but was physically 'different', was evaluated as less competent.

Langlois and Downs (1979) studied 3 and 5 year old nonhandicapped children and found that unattractive children were perceived and expected to behave antisocially. It was also found that both attractive and unattractive children tended to exhibit affiliative behaviors (in terms of proximity, touch, smiling, eye contact and talking) toward peers who were similar to themselves in attractiveness. There was also a pattern found in regards to aggressive behaviors. Unattractive 5 year old children were more aggressive towards peers and no differences in aggression and attractiveness were found with 3 year olds. The authors suggest that this finding may reflect the beginning of a self-fulfilling prophecy; young unattractive children may be labelled as such and in time learn the negative behaviors associated with the unattractive stereotype. Older, physically unattractive children would behave aggressively which, in turn, is the behavior expected of them. This would have obvious implications for the handicapped in an integrated environment, because they are usually perceived to be unattractive, by nonhandicapped peers. Certain maladaptive behaviors may be accepted because of the stereotypic label and these behaviors may be inadvertently reinforced.

Dion (1973) found evidence indicating that even as young as age three, "facial attractiveness is a discernible social cue which has already begun to acquire evaluative connotations"(p. 188). The author suggested therefore, that teachers, parents, and other adults associated with integrated play environments in the child's early years could serve to facilitate desirable impressions of children based on their strong character points, rather than their physical attractiveness.

Based on evidence such as the aforementioned, age is often an important variable to be considered in integration. It is generally assumed that integration should occur in the child's early years because younger children are thought to be more tolerant of a wider range of individual differences (Bricker, 1978; Guralnick, 1976; Wolfensbeger, 1972). There is some evidence to support this contention.

White (1980) conducted a study at grade school level where mainstreaming was introduced. She found that handicapped children were isolated and rejected by the

nonhandicapped and that the handicapped produced more maladaptive behaviors. A similar study conducted at the preschool level showed the handicapped to be much more socially successful in a mainstreamed environment.

It has also been suggested that even though younger children may be more accepting classmates, mixed chronological or developmental ages may also be facilitative to the integrative process. Lougee, Grueneich and Hartup (1977) found that the sociability of individual children differed in two social situations. Generally, 3 year olds were more socially active when associating with a 5 year old versus another 3 year old, and 5 year olds were less socially active with a 3 year old than with a 5 year old. It appeared from results of this study, "that a large capacity exists, even among very young children, for making subtle accomodations in social behavior to the needs and demands of other children" (Hartup, 1978, p. 36). "Mixed-age situations may contribute more to the child's socializaton through the 'fine tuning' of social behavior than the opportunity it provides for exposure to new social skills"(Hartup, 1978, p. 38). Therefore integrating handicapped and nonhandicapped children, and thereby creating a social environment involving a variety of developmental levels, may be beneficial to both groups. That is, the nonhandicapped children have the opportunity to learn important social skills by having to make the social accomodations for communication with the handicapped. Conversely, the handicapped are exposed to more advanced and more reciprocal interactions with the nonhandicapped.

Age alone is not the sole factor responsible for facilitation of integration. The environment, in many senses of the word, plays an integral role. White (1980) found that successful integration at the preschool level was partially due to the high proportion of handicapped children mainstreamed and/or minimal teacher structuring of free time. Ispa (1981) also advocated that integration may be more successful when teachers take a less rather than more controlling stance regarding children's behavior. Novak et al. (1980) found that children played more and were less passive when teachers were absent.

Devoney, Guralnick & Rubin (1974), on the other hand, found that the most favourable effects of social integration on handicapped children at the preschool level occurred after the teacher intervened and structured the social play environment. These results were found in a familiar and supportive classroom environment where nonhandicapped children were integrated in small numbers, into the handicapped children's classroom. Fredericks et al. (1978) found with moderately and severely handicapped children, that structured activity was beneficial in the integrative process. Field et al. (1981) also suggest that social acceptance of the minimally handicapped child was faciliated in an integrated environment with equal numbers of handicapped children in a familiar free play setting.

Much of the research on social integration using free play involves play materials such as small toys, blocks and art material in a classroom environment, although, there is evidence to suggest that the actual physical setting of the play environment may also influence integration.

Nordquist (1978) suggests that aggression is more likely to occur when play space is restricted. Peterson (1982) found higher rates of social interaction on the playground and more isolated play in the classroom. Pipe, Redman and White (1983) found the effects of social play during integration varied across situations but the effects of integration generalized better from the playground than it did from the classroom back in the special school environment.

Fredericks et al. (1978) found that severely and moderately handicapped children benefitted from inclusion in free time activities with the nonhandicapped, given a structured program where teachers instruct the handicapped on how to play and interact with the nonhandicapped. It was found that when the structured program was introduced in one environment (the motor room) that social play behaviors also generalized to a nontreatment room (the art room).

Novak et al. (1980) studied five integrated and nonintegrated preschools over a 3 year period. Behaviors were observed in two of the five preschools with different play environments. Since there was variation between the preschools in variables relating to the environment,

results should be viewed cautiously. More vigourous play and visual and tactile exploration of the environment was exhibited by children who had available a large gymnasium for their play period as opposed to a group who used the standard classroom free play environment. These findings were reflected equally between the handicapped and the nonhandicapped. Since the handicapped and nonhandicapped children showed similar behaviors in both environments, the authors suggested that variation in the free play environment alone (for example using a gymnasium rather than a classroom for free play) may not be sufficient to increase the behaviors of handicapped children to levels similar to that of nonhandicapped children.

Social interaction between the nonhandicapped and the handicapped differs from interactions within either group in segregated environments. Many variables such as age, teacher direction and environment play important roles which are difficult to generalize from one study to another. As Hartup (1978) states "intergroup contact must involve mutually shared norms and cooperative activity in order for reduction in tensions and productive social intercourse to occur"(p. 47). Without establishing these sorts of cooperative goals it is futile to judge the social success of mainstreaming.

Environment, Play Materials, and Equipment

The importance of the environmental conditions, in regard to social interaction, has been discussed and its importance in terms of physical skill or activity should not be overlooked.

Distefano and Brunt (1982) postulated that varying degrees of environmental demands exist in physical activity settings that affect performance of a learned motor skill. Conditions under which a child learns, or in which a skill evaluation is given, are different to those in which the child is expected to perform the skill, in an activity context. To verify this hypothesis, 8 to 10 year old mildly mentally handicapped and nonhandicapped children were observed performing a 4.6 metre run under three conditions. Condition 1 simply involved running the distance. Condition 2 involved running the distance and changing direction at the

finish in accordance with a cue from one of three illuminated lights (choice task). Condition 3 was the same as the second except one light was randomly withdrawn (by being covered) thereby reducing movement uncertainty (pre-cue task). The mentally handicapped children increased both movement-time and reaction-time under conditions 2 and 3. In other words, they were unable to attend to environmental stimuli and maintain performance on a simple running task. One finding of significance was that the handicapped children did not improve performance under condition 3 as compared to condition 2. The authors suggested that in an attempt to decrease environmental demands, the covered light may have been perceived as an increase in the stimuli that governed the response by the handicapped children. The nonhandicapped subjects showed an insignificant increase in reaction time for the choice task only, exemplifying the simplicity of the task.

Therefore it is clear that controlling or manipulating environmental stimuli and cues are important in both the learning and performance of basic motor skills in mentally handicapped children. Stimulus 'overload', both in terms of environment and equipment, are salient considerations in integrating mentally handicapped children in physical activity.

One of the most important variables affecting the outcome of the integrative process is the materials or equipment available within a particular play environment (Guralnick, 1977). Play material and equipment is influential both in terms of the nature and duration of social interaction (Apolloni & Cooke, 1978) and in terms of skill practice and development.

As early as the 1930s, studies were being conducted considering play material in relation to social behavior (Parten, 1933, Johnson, 1935). Many studies, not only the early examples but also those studies conducted up to the present, usually investigated social behavior in relation to play material such as puzzles, paint blocks and puppets rather than play equipment designed to elicit gross motor skills.

One research strategy that is often used especially in terms of the severely handicapped, is to examine play material preferences and effects on socialization in the nonhandicapped for general information and then to make an attempt to apply these findings to the needs of the

handicapped (Wehman, 1976). This is often the necessary tactic for two reasons, summarized by Wehman:

1. Little research is available to document the type of toys, materials and equipment that are most effective in eliciting play behavior from the mentally retarded at different age and functioning levels.
2. Toy manufacturers do not typically design play materials for severely and profoundly retarded persons. Consequently, selection must come from nonretarded preschooler's preferences, or toys must be made and adapted (p. 46).

Parten's (1933) early study of social behavior in nonhandicapped preschoolers with various types of play materials revealed that playhouse and dolls were the materials most associated with cooperative play; playing with sand, paper, clay, swings, beads, and paints usually evoked parallel play. She also discovered that younger and older children differed in the way in which they played with toys and subsequently there appeared to be differences in the social value of toys.

Cohen, Hulls & Rhine (1978) more recently found similar age-related preference for activity content with preschoolers. Free play was observed in terms of eight different activity contexts including; dramatic play (playing house), art, manipulative play, transient movement, sandbox, woodwork, block play, and 'other play' (e.g. listening to music or stories). Findings indicated that 3 year olds prefer sand, blocks, manipulative and transient contexts; 4 year olds prefer art and 'other' activities.

Two other earlier studies investigated negative social behavior and play material. Green (cited in Nordquist, 1978) found that quarrelling was more likely to occur when children were playing with sand, and social activity was less likely to be argumentative when children were swinging, climbing or riding a rocking horse. Murphy (cited in Nordquist, 1978) found similar results in that fewer quarrels occured when children were involved in play using swings, tricycles and wagons. Obviously then, the latter toys were more isolate in nature and subsequently resulted in less conflict.

Quilitch and Risley (1973) examined this notion of the social nature of specific play material. Toys were categorized as social (for example, checkers, pick up sticks and playing cards) or isolate (for example, puzzles, play doh and crayons). The type of toys given to a group of 7 year old children in free play was found to have a significant effect on the amount of social play and playing cooperatively with each other. Social play occurred 16% of the time when only isolate toys were available and 78% of the time when social toys were available. The actual amount of time spent playing did not vary with the different groups of toys. Quilitch and Risley suggest that this type of information may be extremely valuable in selecting play materials for children in order to maximize children's opportunity to learn and practice social and cooperative play behaviors. Also, they noted the importance of play materials for handicapped children. "Play materials that set the occasion for aggressive play, verbal behavior, sharing behavior, or competition might be used with groups of children suffering certain behavioral play defects"(p. 577).

Poling (1976) paralleled the work of Quilitch and Risley with 4 and 5 year old nonhandicapped children. Similar results were found; isolate and social toys influenced the amount of social play exhibited. Poling also suggested that the presentation of social toys may be combined with other reinforcement or prompting techniques to further increase social behavior in some children. The authors emphasized the necessity to examine the effects of social toys on children with behavior dysfunctions since they may react differently or not at all. It is difficult to generalize to other populations and predictions with respect to social behavior should be considered tentatively.

Complexity and amount of equipment in a play setting are other variables that have been investigated with nonhandicapped children. Johnson (1935) investigated the amount of play equipment available on a playground on the behavior of 3 to 5 year old children. She found that children were resourceful whether the playground was meagerly equipped or well equipped. Results suggested that extensively equipped playgrounds facilitated a greater amount of bodily exercise and play with materials, fewer social contacts through games, and less

undesirable behavior. The playground with less equipment produced the opposite finding. An increase or addition of play materials resulted in a decrease in the use of the permanent equipment. Johnson suggested from a short-term standpoint that individual endeavor may be increased and undesirable behavior decreased by introducing equipment. Caution should be exercised in interpretation of these results since over a longer time period too much equipment may interfere with social development.

Scholtz and Ellis (1975) also conducted a study with the purpose of examining the effect of the complexity of the play environment on peer interactions with 4 and 5 year olds. With a setting of low complexity, results revealed high novelty effects of play objects and the children interacted more with toys than with familiar peers. Over time, this effect diminished and preference shifted to the more stimulating peer interactions. A complex setting, where apparatus was capable of eliciting more varied responses, resulted in a sustained period of object interaction, before the children finally turned to peer interactions. Scholtz and Ellis concluded that preference for interaction with peers increased as a result of repeated exposure, and preference for interaction with play materials decreased. The rate of decrease was determined by the complexity of the play environment.

Grazma, Corush and Ellis (1972) investigated this same idea of complexity, but in reference to actual play apparatus. Three types of climbing trestles were observed in regards to their attractant value for children. Children initially showed preference for a climbing frame that was modified with side panels, over a simple climbing trestle with no additions. After a period of four weeks the novelty effects decreased and this preference was reversed. The authors speculated that this was the result of an unsuccessful attempt at increasing the complexity of the apparatus; in actuality more play functions and potential stimuli were decreased than increased. A third trestle with a variety of additions showed persisting positive effects from adding more appropriate complexity to a simple play apparatus. The authors propose that, in this study, findings of sex differences as a function of complexity were, in actuality, a reflection of a social hierarchy rather than differences in response to the complexity

of apparatus. Observations revealed evidence of factors such as active possession, saturation and overflow occurring in the play environment. Active possession, in this case, implied that boys gained active control, and occasionaly excluded, girls from a particular apparatus. This caused saturation, whereby the mere presence of the boys inhibited access to the girls. Subsequently, this would cause overflow to another apparatus.

From this finding, a tentative parallel may be made to integrated physical activity programs. The social hierarchy would most likely consist of highly skilled nonhandicapped children at the top, and proceed down to lower skilled handicapped children. The possibility exists that higher skilled nonhandicapped children, or perhaps particularly aggressive handicapped children, may have the capability of possessing a piece of apparatus and inhibiting use by other program participants. It is therefore apparent that factors such as these may occur in play settings and should be given careful consideration and control.

Viewing play situations from another vantage point, Karlsson and Ellis (1972) examined height preferences of young children at play. Results indicated that the height preferred by young children playing on climbing apparatus was significantly related to the specific complexity of the equipment. Boxes, considered the least complex, were used with the highest height preference. Trestles, involving slightly more complexity, were used at the next highest height preference, and a rope net, the most complex, was accompanied by the lowest preferred height.

Grazma (1973) analyzed children's play in regards to encapsulating objects, in this case, translucent, transparent and opaque enterable boxes. He found that a high level of encapsulation which combines the visual and tactile, was of highest preference to preschool children. Grazma speculated as to the factors of importance underlying this preference, these being: exploration of stimulus contrast (variation) provided by encapsulated space; a need for reducing stimulus overload; the provision of a "safe" retreat; movement toward a defendable space; withdrawal from adult observation and control; and, contextual requirements arising from game and fantasy play (e.g. playing house and fright games). Grazma suggested that

from general observation this final factor may be the most powerful of them all.

It becomes obvious that there are numerous variables that influence the type and amount of play behavior in young children. Whether these same variables affect play behavior in mentally handicapped children is unclear and comparisons to the nonhandicapped should be tentative. Further research in this area is needed to determine the importance of some of these variables in the play of handicapped children.

To date, a meagre amount of research investigating these same types of questions with handicapped children is available. Again, the research that exists primarily concerns social behavior and play materials rather than play equipment.

In a general study, Switzky, Ludwig and Haywood (1979) examined play preferences with regards to age and complexity of the play objects in handicapped and nonhandicapped children. It was found that older handicapped children spent more time exploring less complex stimulus objects and older nonhandicapped children spent more time exploring more complex stimulus objects. The authors concluded from this study, that developmentally, exploratory behavior precedes play behavior. With continued exposure to complex stimuli, children's exploratory behavior declined and play behavior increased. Play behavior appeared to be associated with less complex stimuli in preschool children.

In regards to the social aspect of specific toys, Beckman and Kohl (1983) examined these effects on the interactions of play in integrated and nonintegrated groups of preschoolers. Toys were categrorized as social, for example, blocks and puppets, isolate, including books and puzzles, and mixed, combinations of the two groups. Findings revealed that when only social toys were available, more interactions occurred in both the integrated and nonintegrated groups than in the other two conditions. When social toys were present there was less toy play than under other conditions. Beckman and Kohl echoed the thoughts of other investigators in suggesting that "manipulation of the toys available in the child's environment may be a successful and unobtrusive way to facilitate social interaction and potentially maximize the impact of integrated settings for handicapped preschoolers" (p. 174).

Stoneman, Cantrell and Hoover-Dempsey (1983) also investigated effects of play materials in facilitating social interactions between handicapped and nonhandicapped preschoolers. Only one difference was found between the handicapped and nonhandicapped in their use of play materials across the school year. Handicapped children decreased the amount of time spent with fine motor materials and the nonhandicapped increased their use over time. Both groups decreased the amount of time playing with no toys. Art and playing house were the most preferred activities for both the handicapped and nonhandicapped preschoolers, and the highest frequency of mixed social interactions occurred during these activities. Analysis of toys for proportional use revealed that more social interactions between the handicapped and nonhandicapped were associated with blocks and vehicles, followed by water play. Play with library materials evoked less frequent mixed interactions. These results were congruent with Quilitch and Risley's (1973) study in revealing that some activities such as library materials brought about solitary play while others, such as blocks and water play, increased the probability of interaction between the handicapped and nonhandicapped. Two other associated findings were that more negative social interaction occurred with blocks and vehicles and more teacher-child interactions occurred when children were not playing with any toys.

Very few studies examine play behaviors in relation to equipment designed to elicit gross motor activity. In a rare study of this type, Linford et al. (1971) examined differences in equipment usage between children with Down's Syndrome and nonhandicapped children. It was found that differences did exist in equipment preference; nonhandicapped children preferred climbing boxes the most and closed tubes the least; the children with Down's Syndrome preferred open tubes the most and a wooden rocker the least. Also of note, children with Down's Syndrome made greater use of free space as opposed to the play equipment. Possible reasons for the occurrence of the latter may be that handicapped children prefer less complex stimuli or because they spend more time watching the nonhandicapped perform with the intent to model their behavior. The authors recognized these possibilities but they believed that, in the case of this study anyway, their subjective observations would not confirm these hypotheses.

Wall (1977) studied equipment preference and free play patterns in moderately mentally handicapped preschoolers. Results indicated that the slide, small toys, climbing apparatus and tricycles were the most preferred activities, accounting for more than 65% of total free play time. Seventy percent of free play time of these handicapped subjects was spent using equipment designed for gross motor activity. Wall purports that many factors play a role in equipment preference. These are; the amount of skill instruction given on a particular piece of equipment, the level of a child's skill on the apparatus, the variety of purposes for which the equipment can be used and the attractant features of the equipment.

Obviously, both for handicapped and nonhandicapped children, the individual characteristics of the child, the play equipment or material, and the environment are interdependent factors which may influence integration. This information is also important to consider in activity programs for children. Apolloni and Cooke (1978) suggest the importance of teachers recognizing the influence of play materials on social interaction in integrated activity environments. They suggest that the teachers must be able to know how to use the equipment or material, there must be sufficient materials available to allow interactive participation by all children present, as well as sufficient duplicate materials available to permit imitative behavior by handicapped children who might observe and imitate a model. This is not to say that isolate play behavior is undesirable. For mentally handicapped children, using equipment on their own may be the most effective way of learning or practicing a skill; distractions are minimal and total concentration may be given to the task. Teachers must be aware of the difference between productive and non-productive solitary play in an integrated setting.

There is a definite need for further research in this area to determine the appropriate combinations of these factors to optimize each child's active participation in the play environment.

Chapter III

Methods and Procedures

General Research Scheme

This investigation involved related but different research questions, therefore data were analyzed as if two separate and distinct studies were undertaken. The same overall population, research design and recording strategy were used for both studies, and videotaping allowed for the freedom of observing and coding data with two different focusses.

Program Participants

Participants involved in the activity program included 16 borderline moderately to dependent mentally handicapped children. Six females and 10 males, between the ages of 5 to 10 years, made up this group. All of these children were students from two special classroom groups from two different public schools in Edmonton, Alberta. During the course of the program, one female student was transferred to another school and, subsequently, one female was transferred into the classroom group attending the program. All of these children were participants in the PREP Program (Watkinson & Wall, 1982) during the previous four months, therefore were familiar with both the facility and each other. Two children from this handicapped group were involved only minimally in the activity program, one due to severe behavioral problems and one due to severe visual impairment and behavioral problems.

Eight 5 year olds, from a University campus daycare facility, also attended the program one day a week. These participants included four males and four females with no known intellectual or behavioral difficulties. This group had physical activity programming in the PREP playroom in the previous four months and therefore were also familiar with the facility.

Subjects used for observational analysis in Study 1 and Study 2 were selected from this group of program participants. The remaining handicapped children were involved in the activity program during the segregated setting. They received the same activity programming as

the handicapped subjects. Their presence in the program was very much appreciated and their involvement was integral to the completion of this investigation.

Subjects - Study 1

Subjects for Study 1 included eight mentally handicapped children, ranging in age from 5 years, 11 months to 10 years, 7 months (mean = 9 years, 1 month). During the course of the study, one female was transferred to another school. The remaining seven subjects included 5 males and 2 females, all ambulatory, with various but minimal levels of language ability (see Table 1). These seven subjects were selected from the larger group of handicapped program participants on the basis of previous regular attendance records and minimal behavioral and physical difficulties.

Subjects - Study 2

Subjects for Study 2 included the seven handicapped subjects observed for Study 1, plus seven nonhandicapped children, ranging in age from 5 years, 1 month to 5 years, 11 months (mean = 5 years, 7 months) from the daycare group (see Table 1). Only seven of the eight nonhandicapped participants were selected to be included in Study 2 for two reasons. The first reason was to ensure equivalent numbers of handicapped and nonhandicapped children under observation, and the second reason was that one particular nonhandicapped child had erratic attendance and voiced the desire not to participate in the activity program. When present, this child took on an observer role only.

Setting

All activities for this study were conducted in the PREP playroom at the University of Alberta. The room itself is designed for teaching gross motor skills to young mentally handicapped children. It is spacious (19m x 21m) and well supplied with equipment such as slides, inclines, climbers, mats, tricycles, trampoline, scooters, boxes, and a variety of small

Table 1

Subject Profile

Subject	Sex	Age	Etiology
a. Handicapped Subjects			
1	M	10 years, 4 months	Down's Syndrome
2	M	9 years, 8 months	Down's Syndrome
3	M	10 years, 7 months	Brain damage
4	M	9 years, 11 months	Unknown
5	F	9 years, 1 month	Unknown
6	F	8 years, 1 month	Brain damage
7	M	5 years, 11 months	Down's Syndrome
b. Nonhandicapped Subjects			
1	M	5 years, 10 months	
2	M	5 years, 2 months	
3	M	5 years, 1 months	
4	F	5 years, 10 months	
5	F	5 years, 11 months	
6	F	5 years, 9 months	
7	F	5 years, 4 months	

play equipment such as balls, hockey sticks, bean bags and hoops.

Two video cameras, used for recording purposes, were located behind screens (i.e. only the top portions of the cameras were visible) in one corner of the room (see Appendix A). All associated camera equipment and monitors were housed inside an adjacent observation room.

Activity Program

The activity program was 10 weeks in duration. There were two, 1 hour morning sessions per week. A segregated program, with only mentally handicapped children participating, was conducted on Wednesdays. An integrated environment was programmed for Friday. Due to school and transportation schedules, the days or the times of the different sessions could not be altered in any way.

Each session, for both environments, approximated the following schedule:

Arrival, change for activity, free play.
Station activity.
Free Play #1 (no play vehicles available).
Cooperative Game.
Free Play #2 (play vehicles available).
Change for school; departure.

Station Activity.

Each week, during station activity, all participants rotated through four stations. These stations were classified as; 1) small play equipment, 2) climbing apparatus, 3) slides and inclines, and 4) locomotor skills. Each day, two of the four stations were offered. Since the handicapped subjects were present for both sessions each week, they rotated through all four station activities in a week. All the other children, both handicapped and non-handicapped, received instruction in only two station activities per week, since they only attended the

program on one day a week. Each week a new program of station activities was offered and the four program instructors rotated weekly to direct a different station. Children were grouped in teams of four, whenever possible, to include two handicapped and two nonhandicapped children.

Free Play #1 and #2.

During these two periods of unstructured free play time, filming for data collection occurred. No interaction between teachers and children was permitted except for discipline or safety reasons.

Cooperative Games.

One cooperative game was incorporated into each session. The game was designed to allow further opportunity for the subjects to interact with each other in a group setting. The same game was played on Wednesday and Friday, to allow the handicapped subjects extra practice time to familiarize themselves with the tasks, before playing it in the integrated setting.

Single Subject Design

Professionals working with mentally handicapped populations typically provide service through individualized programming. In evaluating program outcomes, researchers, teachers and clinicians are primarily concerned with the effects of powerful, clinically significant independent variables, for example, instructional strategies. Traditionally, evaluation of service has been difficult, due to the simple fact that group research designs are insensitive to individual differences. Crucial limiting factors such as a wide range of inter-individual variability in groups of handicapped individuals, high intra-individual variability within each 'defined' group of handicapped individuals, limited availability of a sufficiently large homogeneous sample and high incidence of subject mortality, impede the use of traditional research strategies with the handicapped (Wall, 1981).

Single-subject designs, in all aspects of research may be important methodological tools that are used to answer numerous research questions with regards to individuals or groups (Kazdin, 1982). In the case of this study, results were examined both individually, to investigate specific effects of the independent variable on each subject, and generally, to identify overall patterns for the group as a whole.

Research Design

Traditionally in applied research ABAB reversal or withdrawal designs and multiple baseline designs have been employed. These designs are potentially inflexible and may lock the experimentor into a rigid time framework. The Alternating Conditions Design (Ulman & Sulzer-Azaroff, 1975) may have the efficacy to overcome some common problems experienced by experimentors using more traditional designs.

In its most simplistic form, the alternating conditions design (ACD) can be defined as "the repeated measurement of a behavior under alternating conditions of the independent variable"(Ulman & Sulzer-Azaroff, 1975 , p. 379). An ACD can be used to compare the effects of treatment versus baseline condition or to compare two different interventions (Barlow & Hayes, 1979). The ACD involves the alternation of the independent variable(s) across time, for example, days or sessions. It should be stressed that the implementation of the alternate conditons of the independent variable(s) is <u>not</u> dependent on changes in behavior. The experimental condition(s) may be alternated on either a systematic or unpredictable schedule. Experimental analysis is conducted on the different response patterns, and experimental control is demonstrated if patterns of responding develop that are unique to each experimental condition (Ulman & Sulzer-Azaroff, 1975).

Initially, brief baseline data may be collected, although this is not a crucial part of the design. Following this, a treatment phase is implemented introducing alternate conditions of two or more independent variables, one of which may be a baseline condition. Once experimental control is clear, the more effective treatment may be implemented across all time

periods for a final phase if desired.

Rationale

There appear to be many advantages of an ACD over the more traditional methods of single subject research design. This design is useful in dealing with an independent variable which is unlikely to return to baseline levels in a withdrawal or reversal design, for example, when there is learning involved in the task. Differential effects of treatment may rapidly emerge, and the experiment may be ended as soon as experimental control is demonstrated. Caution must be exercised in following this procedure, however. Since novelty effects may have caused early treatment benefits to occur, an experimentor may prematurely and incorrectly select what is perceived to be the most beneficial treatment. A follow-up phase could confirm the accuracy of the choice. Another advantage to the ACD is that there is no need for the time delay that is normally associated with a return to baseline phase. This design is also appropriate when there is a tendency for unstable baseline data, or baselines that show acceleration due to learning effects. This design is more ethically acceptable by the public and practitioners in the field. Behaviors do not have to be reversed, as in a withdrawal or reversal design, and treatment is not withheld from subjects for any length of time, as in a multiple baseline design. An ACD is a viable method for assessing stimulus generalizations, by enabling the experimentor to compare behavior change in different situations, for example different settings or with different change agents. Since the ACD has more manipulations per unit of time, there may be a more convincing demonstration of treatment-caused effects, and it is possible for more instructional alternatives to be efficiently compared (Ulman & Sulzer-Azaroff, 1975, p. 388).

An alternating conditions design was chosen for this research study for a number of reasons. Absenteeism often plagues studies involving individuals from special populations, especially in programs of physical activity. This is usually owing to illness and overprotective parents or guardians. Using an ACD, it may still be possible to get a relatively clear picture of behavior, despite absences (for example, see Subject 3, Figures 4 and 8). A withdrawal or

reversal design requires withdrawing the treatment variable on one or more occasions. Hypothesized benefits of participation in an integrated environment may be learning related, for example, acquiring a new motor skill. Therefore, when the treatment phase is withdrawn, it would not be possible for the behavior to revert to baseline conditions. An ACD compensates for this since an overall trend, even if learning is acquired, may still be detected. Since it was the purpose of the study to observe integrated environments with equivalent numbers of handicapped and nonhandicapped children, a multiple-baseline design would also have been an inappropriate choice. In this type of research design the independent variable is introduced to each subject over a varying period of time. Therefore, in using a multiple-baseline design, it would be difficult to fulfill the group requirements allowing each subject to participate in an integrated activity environment with equal numbers of handicapped and nonhandicapped children.

Internal and External Validity

The purpose of a research investigation is to examine the direct influence of an independent variable on another, dependent, variable. Research must attempt to examine the influence of treatment variables in a way that minimizes confounding effects of extraneous variables (Kazdin, 1982). An experiment is internally valid to the extent that the behavior change may be attributed to the independent variable (Kazdin, 1982; Kerlinger, 1973). Numerous threats to internal validity exist and the extent to which each one is present is determined by the nature of the research design. An alternating conditions design, is subsumed under the general classification of multiple-treatment designs (Kazdin, 1982) and is therefore subject to the same potential threats to internal validity. These include; history, maturation, instrumentation, subject mortality, and reactivity (Kratochwill, 1978).

The effects of history and maturation may be potential threats to a study spanning a three month period. An ACD minimizes these effects by rapid alternation of treatment conditions across the entire research period. Instrumentation and reactivity may also be

potentially threatening to internal validity. The effects of instrumentation were reduced by having the observers code the videotaped data in random order, over a brief time span. Subject mortality had no significant effect on this study. As previously stated, one handicapped subject did leave the program during the course of the study, and one nonhandicapped subject had an erratic attendance pattern. Since the videotaping allowed for coding after the completion of the study, it was possible to disregard the presence of either of these subjects when they were in attendance. Reactivity to the presence of the cameras was considered a minimal threat because all of the children had previous experience with the playroom as well as with the cameras. Further, the cameras were unobtrusively situated to the fullest extent possible. The children were also given two free play sessions, prior to filming, to allow for adaptation to the environment. Reactivity to the instructors, classroom teachers and aides was more difficult to control. The teachers and aides were asked to either leave the playroom area or to view the free play session from inside the observational booth. The four program instructors involved in the research project were situated, as unobtrusively as possible, around the periphery of the playroom. They were instructed not to interact or interfere with the children's play in any way except for safety or discipline reasons. The children, on occasion, initiated interaction with the instructors. When this occurred, interaction was terminated by the instructor as quickly as possible. The extent that the instructors' presence affected the children's play is indeterminable within the context of this investigation.

External validity, or the extent to which the results of the study are generalizable, is also a necessary consideration. Population and ecological factors contribute to the external validity of an investigation (Kratochwill, 1978). The conceptualization of the dependent variable in terms of the type of variable (e.g. frequency or duration measurement), as well as a concise operational definition of the dependent variable, are significant factors in generalizing experimental results. Further, the dependent variable must be measured accurately and reliably (Kratochwill, 1978). Pertinent threats to external validity for this study would include generality across subjects, settings and time, and multiple-treatment interference (Kazdin,

1982). Obviously, the generalizability of findings to other settings, subjects and times of day is limited. Since the environment was a familiar free play environment to all the subjects, it may be hypothesized that similar behaviors would occur in similar types of settings, although less well equipped playrooms or outdoor playgrounds, for example, may well evoke different responses. Findings should only be generalized to a similar group of subjects, though a varied group of handicapped subjects, in terms of developmental levels, was represented in this study. Due to the necesssity of following school schedules, the times of day and days of the week that the program was conducted, could not be altered. Hypotheses as to whether similar results would be found at other times of the day or week, may only be speculative in nature.

Multiple-treatment interference may also affect the external validity of this type of research design. Kazdin (1982) defines the term as referring "to the possibility that the effect of any intervention may be influenced by the other interventions to which it is juxtaposed" (p. 194). Counterbalancing treatments may potentially minimize this effect. Again, it was necessary to adhere to school schedules, although it was possible to alter the order of occurrence of the integrated and segregated environments on three occasions. Therefore, all possible combinations of treatment order were represented in this study. Subsequently, an alternating conditions design proved ideal for the nature of the investigation being carried out.

Ecological validity, defined by Kratochwill (1978) is "the extent to which situations compared in the experiment are representative of the population of situations to which an investigator wishes to generalize" (p. 24). Of greatest significance in the present study, in terms of ecological validity, was the ratio of handicapped to nonhandicapped children. It is unlikely that equivalent numbers of these two groups of children would be found in the mainstreamed classrooms in the school system. Therefore, the generalizability of the results of this investigation to an environmental situation, where handicapped children are a distinct minority may be limited. A further consideration, in terms of ecological validity, is the absence of teacher intervention or interference during free play. Again, it is unlikely that such a unstructured situation would be permitted to occur in the classroom or playground. A final

point, to recognize is that the PREP playroom is specifically designed for play instruction, therefore is generously equipped with play apparatus and materials. The regular school or daycare play area may not have such a variety of equipment available. Although these factors limit the generalizability of these results ecologically, the type of environment structured for this study provided the most advantageous circumstances for the mentally handicapped subjects. This study attempted to determine whether integrated environments would affect play or social levels of the handicapped. Structuring an environment with a proportionally larger number of nonhandicapped children, limited equipment choice, and teacher supervision, may have been detrimental to obtaining optimal performance from the handicapped subjects and would have been unmanageable in terms of the number of programs needed to observe students. It was hypothesized, that once the initial questions regarding differences in performance in integrated environments and potential contributing factors to facilitating performance were identified, then the next logical progression would be to conduct this study using conditions that may be more typical in the regular school system.

Independent Variable

The independent variable used for this investigation was an integrated free play setting, used in comparison with a baseline segregated free play condition. These conditions were alternated two days a week, over a period of 10 weeks (20 sessions).

The segregated setting involved seven handicapped subjects plus the additional eight borderline moderately to dependent mentally handicapped children who made up the balance of the two special classrooms. The integrated play environment included the seven handicapped subjects plus the eight nonhandicapped children from the daycare facility.

Recording Strategy

To permit a naturalistic and thorough examination of social interaction and physical activity, videotaped recordings were made of children during free play. The use of an automated recording device offers a number of advantages over live observation. The behavior of the children may be preserved for future use, the videotapes may be replayed when the scoring of a behavior is questionable, and the play sessions do not have to be scored continuously or sequentially in order to obtain reliable data (Sulzer-Azaroff & Mayer, 1977). Further, observer training and coding may take place at any time, either during or after the study. Therefore, it is possible to give total concentration to program administration.

Two Panasonic Video Cassette Recording units and two Panasonic Video Cameras were used. The cameras were started simultaneously with a verbal cue, and fifteen minutes of videotape was recorded each session, during unstructured free play time. A possible 300 minutes of videotape were available for each subject. The 15 minute free play period was divided into two 7 1/2 minute segments, separated by a short cooperative game. The two timed segments were differentiated by the presence or absence of play vehicles (i.e. tricycles, wagons, bicycles). Play vehicles were considerably valued toys and an integral part of play time. It was felt, therefore, that overuse of this equipment may significantly affect play behavior. Subsequently, results for these two environments were analyzed separately.

Filming commenced on the second week of programming allowing two sessions for adaptation with the camera equipment present. At the completion of data collection, all videotapes were time-coded (to 1/10th of a second) to further ensure synchronicity during coding.

Observational Technique

Behavioral research is primarily observational in nature and there are a number of possible strategies for assessing overt behavior. A naturalistic, familiar play environment was used during this investigation. In the study of social behavior in children, naturalistic

observation is frequently used. For the same reasons that this type of observation is useful for studying social behavior, it is also useful for study of behavior related to activity participation. Novak et al. (1980) cite the predominant advantages of using naturalistic observational techniques in the study of social behavior in handicapped children. Firstly, a natural setting provides a more familiar setting for the children as opposed to bringing the child into an unfamiliar, experimentally contrived environment. The child's behavior may be affected by the environment itself. Secondly, it is possible to examine freely-emitted behaviors from the child, rather than observing the child in an environment structured toward obtaining certain responses. Thirdly, it is possible to record more 'holistic' behavior using naturalistic observation, and behavior patterns, rather than specific single responses, may be examined.

The main disadvantages of naturalistic observation include the need for distinct behavioral categories to capture ongoing behavior, and trained observers, able to recognize specific types of behavior patterns (Sulzer-Azaroff & Mayer, 1977).

The choice of an assessment strategy is dictated by the purpose of the program, the characteristics of the target response, and the goals of the intervention strategy (Kazdin, 1982). Frequency measures, time-sampling, and interval recording are the most frequent types of assessment strategies found in the behavioral literature.

Frequency measurement involves simply noting the instances of a particular behavior occurrence. Rate of response can be calculated for any given time period by dividing the frequency of responses by the number of minutes observed for that session. Kazdin (1982) outlines the three main advantages to using frequency measurement; the method is easily applicable for scoring in natural settings, it readily reflects changes over time, and it expresses the amount of behavior performed. The drawbacks to this type of measure are that behavior must be observed continuously and that behavior must be discrete in nature.

Since many researchers have neither the time nor the resources for continuous observation, interval methods of recording provide an economic alternative. In time-sampling, behavior is observed for brief intervals over a longer period of time, for example, every 10

minutes behavior is observed for 5 seconds. An advantage to time-sampling is that results may be representative of behavior over an entire day or a broad time span. Although it is not necessary to monitor behavior continuously, the observer still must follow the client for a long time period. This would be particularly useful and applicable as a method of observation for classroom teachers who could carry on with their normal activities while recording behavior at specified intervals.

Similarly to time-sampling, interval recording measures behavior in relation to time rather than behavioral responses. The two main strategies are termed interval recording and response duration. During interval recording behavior is observed for a specified period of time that is further divided into smaller time units, for example 10 or 20 seconds. Observation is carried out during the interval and recorded at the end of the interval. Powell, Martindale and Kulp (1975) make the differentiation between the terms of behavior recording. Whole interval recording requires that the behavior occur throughout the entire interval and is recorded as such at the end of the interval. Partial interval recording denotes a behavior as occurring if it is observed in any part of the interval. In momentary time-sampling, behavior is observed at the end of the interval only and recorded as occurring or not occurring at that time. Of these three interval methods, momentary time-sampling has been found to give the most accurate representation of behavior (Powell, Martindale & Kulp, 1975; Repp, Roberts, Slack, Repp & Berkler, 1976).

Duration recording, the second method of interval recording involves recording the amount of time that a behavior occurs. Kazdin (1982) suggests that the advantages of this method are; it is particularly useful for continuous rather than discrete behavioral responses and when the experimental intervention technique is attempting to increase or decrease the length of time a behavior occurs. The primary disadvantage in using duration recording is that behavior response categories must be concisely defined.

Duration recording was the observational technique used for Study 1. The amount of time the handicapped subjects spent in each predefined behavior category was examined.

Momentary time-sampling was used in Study 2 as a means of determining whether differences in equipment use and equipment preference existed between handicapped and nonhandicapped children, given the same environment.

Study 1

For this study, two related research questions were investigated. The first question was whether the segregated and integrated environments would bring about differential rates of physical activity or social interactions in the moderately mentally handicapped subjects. The second question to be examined was whether the presence or absence of play vehicles in the activity environment during free play would have any effect on physical activity or social interaction.

Instrumentation

To answer the question of whether any differential changes in physical and social activity were occurring, six behavior response categories were developed (see Figure 1). Generally, these categories described whether the child was active or inactive, and whether he or she was involved socially with any other children, either handicapped or nonhandicapped. Two further categorizations were also necessary; one for negative social behavior, and one for instances of non-observance (see Figure 2). It should be noted that the negative behavior category was primarily intended to capture occurrence of negative behavior of a physical nature (for example, hitting or pushing). Negative verbal responses were not included in this category. This was due to both the low verbal levels of most of the mentally handicapped children involved and the difficulty in the videocamera microphone discerning specific sounds. It would therefore be extremely difficult to judge the intent of many vocalizations.

These categories were somewhat simplistic, nevertheless, it was felt that this approach was necessary for first generation research such as this, to initially answer basic questions regarding the integrative process in physical activity. Further, only ten toggle switches were

Activity Participation

The child may be considered active from two viewpoints. Firstly, the child may be playing with equipment. The minimal level of acceptable activity with equipment is; the child is performing an activity with or on the equipment, which is purposeful, but is at a low skill level, or is of a playful nature (e.g. pushing/pulling a tricycle, moving equipment, pushing scooters down an incline). Secondly, if the child is not interacting with any equipment, he or she must be using some form of purposeful locomotion to travel about (e.g. walking, crawling, rolling, prone progression).

The child is considered inactive when lying, sitting, or standing (i.e. not engaged in any type of locomotor activity). The child may be sitting on or holding a piece of equipment but is not pursuing any purposeful or playful activity with it (e.g. lying on mats, spinning a ball on floor, twiddling a hockey stick) (modified from Wall, 1977).

Social Participation

The child is considered to be with the handicapped if he or she is parallel to (i.e. alongside an individual or group, modelling or participating in the same behavior) or in association with an individual or group of handicapped children only.

The child is considered to be with the nonhandicapped if he or she is parallel to or in association with one or more children who are nonhandicapped, regardless of the presence of other handicapped children.

The child is considered to be alone if he or she is situated independently of other children.

The child will be considered to be involved in the negative behavior category if he or she displays negative behavior of a physical nature (e.g. pulling, pushing, hitting, fighting over toys). This category also includes a child crying or being under disciplinary action.

Figure 1. Social and activity participation categories.

Toggle #	Coding Category
0	Active - Alone
1	Inactive - Alone
3	Active - With Handicapped
4	Inactive - With Handicapped
6	Active - With Nonhandicapped
7	Inactive - With Nonhandicapped
8	Negative Behavior
9	Unobservable

Figure 2. Eight activity and social behavior response categories.

available on the OS-3 Event Recorder (to be discussed later), for duration recording. This necessitated that the combinations of social and activity categories to be somewhat broad in nature. Although the OS-3 had mechanical limitations, in terms of the purpose is served in this study, the experience gained from using a device such as this was invaluable.

Observer Training

Coding for this study was carried out by two observers, the primary researcher and one assistant who had worked in the program. The secondary observer for Study 1 was trained for approximately 6 hours on the use of the OS-3 Event Recorder, comprehension of the various behavior coding categories, and the mechanics of operating the videotape playback setup. Once the observer was familiar with the coding instrument and the use of the videotapes, the primary and secondary observer went through sample videotapes discussing the behavior categories and any problems in delineating behaviors. Observer training ceased once the primary observer felt the secondary observer was competent in the operation of the instruments and observational skills.

A naive observer was originally trained to code the videotapes for this study, but was unable to clearly and consistently identify the subjects on videotape due to poor lighting conditions in some parts of the room during filming. It was concluded that this condition would necessitate observers who were familiar with the individual characteristics of the subjects. This may be considered a limitation to the study since both observers were familiar with the intent of the research. To minimize observer expectancies or bias, tapes were assigned arbitrary numbers by the primary observer approximately one month before coding began. Tapes were viewed in random order, and the session dates were unknown to either observer at the time of coding.

Coding

The two observers coded independently of each other. Tapes were coded in 7 1/2 minute segments in order to differentiate environments with play vehicles versus those without.

Therefore tape segments could be separated into four categories; integrated with play vehicles, integrated without play vehicles, segregated with play vehicles, and segregated without play vehicles.

Coding was accomplished using a behavior duration estimate for the eight defined behavior categories. The apparatus employed for observation was an OS-3 Event Recorder (Observational Systems Inc., Seattle, Wa.) with separate toggle switches for each behavior category. When a behavior occurred, the corresponding toggle was switched on by the observer for the duration of that behavior. Therefore only one toggle switch was on at a single time, with the exception of the 'negative behavior interaction' category. This toggle switch was used solely for a frequency measure, therefore was switched on and off with each single occurrence of a negative behavioral episode regardless of its duration. The appropriate social and participation category was continuously recorded.

The OS-3 Event Recorder was then capable of generating summary statistics for each of the predetermined behavior response categories for each tape segment. This allowed for the most accurate method of determining the behaviors being exhibited during free play time, since observation was continuous.

Reliability

Interobserver agreement was calculated across all behaviors and all subjects on the fourth, tenth and eighteenth day of the program (15% of the data). Reliability was calculated in three ways. First, general reliability across all environments (segregated, integrated, with play vehicles and without play vehicles) was calculated for each of the six behavior categories (negative and unobservable categories were not included) using an analysis of variance (see Table 2). Reliability coefficients ranged from .873 to .998 with a mean of .963.

Interobserver agreements were also calculated using the same method for each behavior, however this time differentiating between environments without play vehicles (environment 1) and those with play vehicles (environment 2) (see Table 2). This would enable

Table 2
Interobserver agreement for all behavior categories, across environments (Study 1).

Behavior Category		Agreement
a. Both Environments		
active - alone		.989
inactive - alone		.998
active - with handicapped		.996
inactive - with handicapped		.956
active - with nonhandicapped		.873
inactive - with nonhandicapped		.970
	$\bar{x}$ =	.963
b. Environment 1 (no play vehicles)		
active - alone		.990
inactive - alone		.997
active - with handicapped		.998
inactive - with handicapped		.990
active - with nonhandicapped		.878
inactive - with nonhandicapped		.985
	$\bar{x}$ =	.973
c. Environment 2 (play vehicles available)		
active - alone		.986
inactive - alone		.996
active - with handicapped		.967
inactive - with handicapped		.949
active - with nonhandicapped		.808
inactive - with nonhandicapped		.930
	$\bar{x}$=	.939

analysis of whether reliability differed depending on the environment. Reliability resulted in ranges of .878 to .998 and .808 to .996, with means of .973 and .939 for environment 1 and environment 2 respectively. These high levels of interobsever agreement indicate minimal effects of observer drift.

Intraobserver agreements were calculated using a random selection of subjects, environments, and sessions accounting for approximately 5% of the data. Ranges lay between 79.81 and 97.63 with a mean of 86.16 (see Table 3). Again, high levels of intraobserver agreement indicate minimal effects of observer drift.

Treatment of the Data

The data generated from the observations in Study 1 were extracted and categorized in terms of active participation (behavior categories 0, 3, and 6) and social interaction (behavior categories 3, 4, 6, and 7) for each subject. These data were then transformed to percentage of observable time for environment 1 (no play vehicles available) and environment 2 (play vehicles available). Average scores, between these two environments, were then presented graphically, differentiating integrated and segregated sessions. Data were then subjected to visual inspection (DeProspero & Cohen, 1979; Parsonson & Baer, 1978).

Study 2

The research question that was investigated in this study was whether there were differences in equipment preference and level of equipment use between nonhandicapped and handicapped children, given the same environment.

Instrumentation

To determine equipment preference and level of use for both the mentally handicapped and the nonhandicapped subjects, seven equipment and activity level categories were developed. Equipment was divided into four categories; large play, small play, play vehicles and no

Table 3

Intraobserver agreement across all behavior categories; random subjects and random environments (Study 1).*

Session #	Environment	Agreement across all behavior categories
1	segregated; play vehicles	97.63
2	segregated; play vehicles	80.82
2	segregated; play vehicles	83.82
3	integrated; no play vehicles	82.06
3	integrated; no play vehicles	83.83
4	segregated; play vehicles	91.57
6	segregated; no play vehicles	90.92
10	integrated; no play vehicles	84.66
10	integrated; no play vehicles	79.81
11	segregated; no play vehicles	81.84
12	integrated; play vehicles	89.54
18	integrated; play vehicles	85.94
18	integrated; play vehicles	88.26
	$\bar{x}$ =	86.16

* based on 5.5% of the data

equipment. Activity level was divided into three categories; inactive, moderate activity and vigorous activity (see Appendix A). A child was coded for equipment use if he or she was interacting with it in any way, for example, holding, sitting on, or playing with a piece of equipment. A child could be coded as using two or more pieces of equipment at the same time (e.g. holding a ball while jumping on the trampoline). For analysis, a further category of multiple equipment use was used to indicate the occurrence of this situation.

Activity participation was defined by the level of vigorousness of movement in terms of cardiovascular or muscular involvement. For example, throwing, which primarily involves upper body movement, was considered moderate activity, whereas jumping on a trampoline which requires more large muscle and cardiovascular involvement, was considered vigorous activity.

Observer Training

Coding for this study was completed by the primary researcher and a secondary observer (different to the observer coding in Study 1). The secondary observer for Study 2 was first briefed on the behavioral definitions. Problems and clarification dealing with these behavior categories were discussed with the primary researcher. Sample videotapes were then used to further differentiate behaviors in general, then the observational strategy was tested using a momentary time-sampling procedure. After expertise was gained in observing and coding sample tapes, observation began using the research videotapes.

Coding

Coding was carried out using the same set of videotapes as for Study 1; however only ten segments were used. The segments chosen were integrated settings when play vehicles were available. These sessions were chosen so that analysis could be made with a full complement of equipment available to all children. Data were gathered on the seven handicapped subjects plus the seven nonhandicapped subjects, as previously described.

Coding was completed using a momentary time-sampling procedure (Powell, Martindale, Kulp, Martindale and Bauman, 1977), using 20 second intervals over a period of eight minutes. Each observer coded approximately half of the data, overlapping on approximately 30% of the data. This overlap was necessary for reliability checks.

Reliability

Intraobserver agreement was obtained on approximately 30% of the data. Observers coded simultaneously, although independently coding different subjects. The primary observer carried out regular reliability checks on two subjects each session. These were randomly chosen and coded in random order. The secondary observer was unaware of which subjects were being checked. Using point by point agreement (Kazdin, 1982) reliability was established with a range of 85.42 to 97.92 with a mean of 90.83 (see Table 4).

Treatment of the Data

Data from the videotapes were transcribed using a checklist system (see Appendix C) incorporating the three levels of equipment use; inactive, moderate, and vigorous, and four equipment classifications; large play, small play, play vehicles, and no equipment.

Table 4

Interobserver agreement across two subjects using point by point agreement (Study 2).

Session	Agreement
1	93.75
2	89.58
3	97.92
4	85.42
5	89.58
6	87.50
7	97.92
8	87.50
9	91.67
10	87.50
$\bar{x}$ =	90.83

Social Validation

In addition to the research data obtained in Study 1 and Study 2, the question of social validation was examined. A questionnaire was given to the staff from both the schools and the daycare (see Appendix C). Written subjective responses were requested in regard to the teachers' views on the program organization and effectiveness.

Chapter IV

Results

Study 1

The general research question examined in Study 1 was whether handicapped children are differentially affected, in terms of activity participation and social interaction, in integrated and segregated play environments.

In applied research, experimental and therapeutic criterion are used to evaluate data (Kazdin, 1982). The experimental criterion refers to the way that the data are evaluated to judge whether or not experimental control can be demonstrated. This is usually accomplished by a visual analysis of graphic data. The therapeutic criterion refers to the clinical significance of the results. This is an important aspect of applied research. Results may appear experimentally to have had an effect, however, consideration must be given to whether the behavior change is an important one in the everyday lives of the individuals in question.

In a single-subject research design, the experimental criterion is judged by evaluating data at different points over time (Kazdin, 1982). In order to meet the experimental criterion of an alternating conditions research design, behavior change must be consistent with each phase of the implementation of the independent variable. In this case, a unique behavior pattern should be evident for the integrated environment and for the segregated environment.

General Patterns of Active Participation

Data from this study were evaluated in two ways, both in terms of activity participation and social interaction. First, to get an overall picture of the general patterns of active participation in the free play environment, graphs depicting subjects' mean scores from the two 7 1/2 minute play periods each day were analyzed (see Figures 3 - 6). Visual inspection reveals that four of the seven subjects showed no consistent differences in active performance between the segregated and integrated environments. Subject 6 (Figure 5) and Subject 7

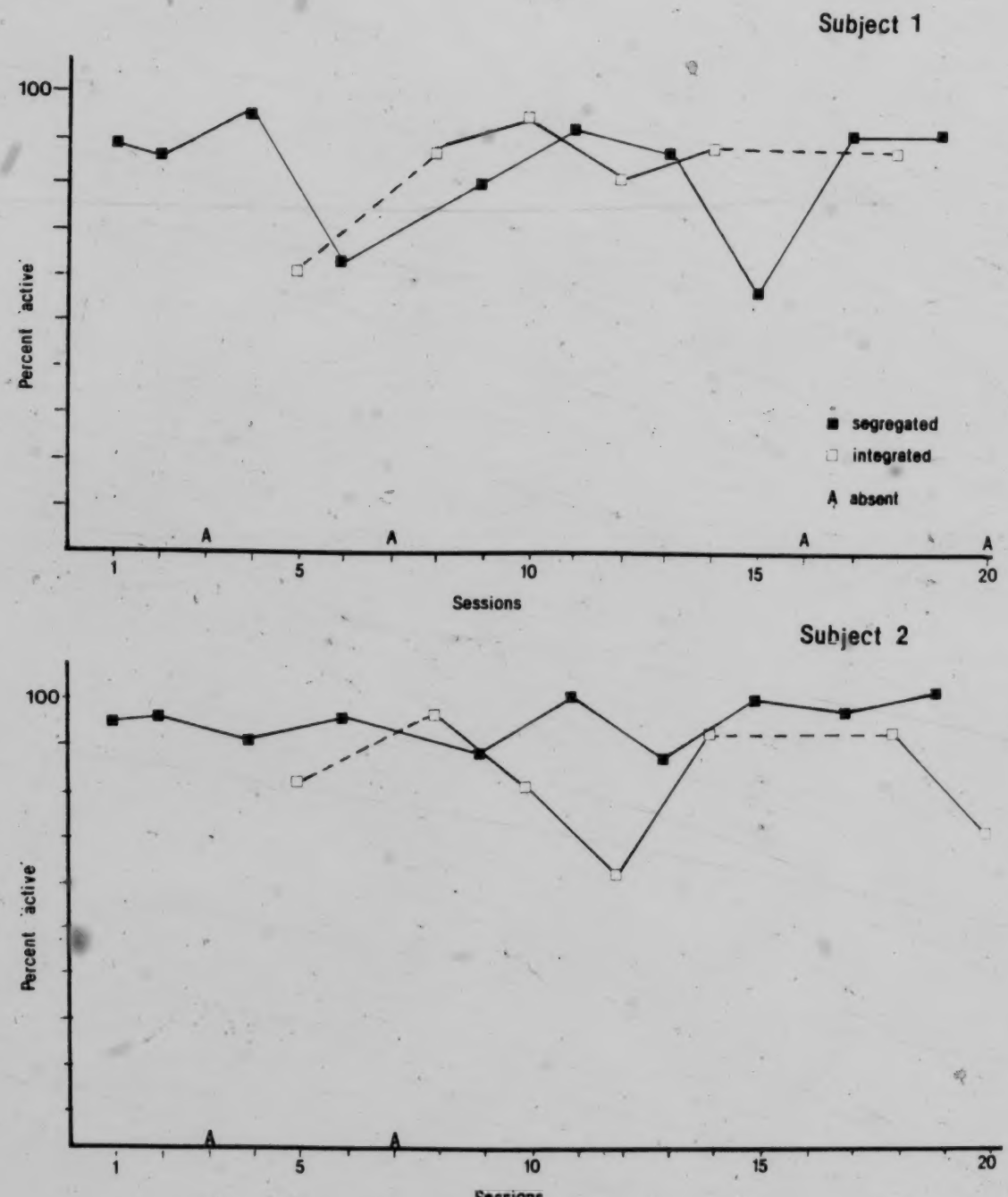

Figure 3. Average percent of observable time 'active' for Subjects 1 and 2 in segregated and integrated settings.

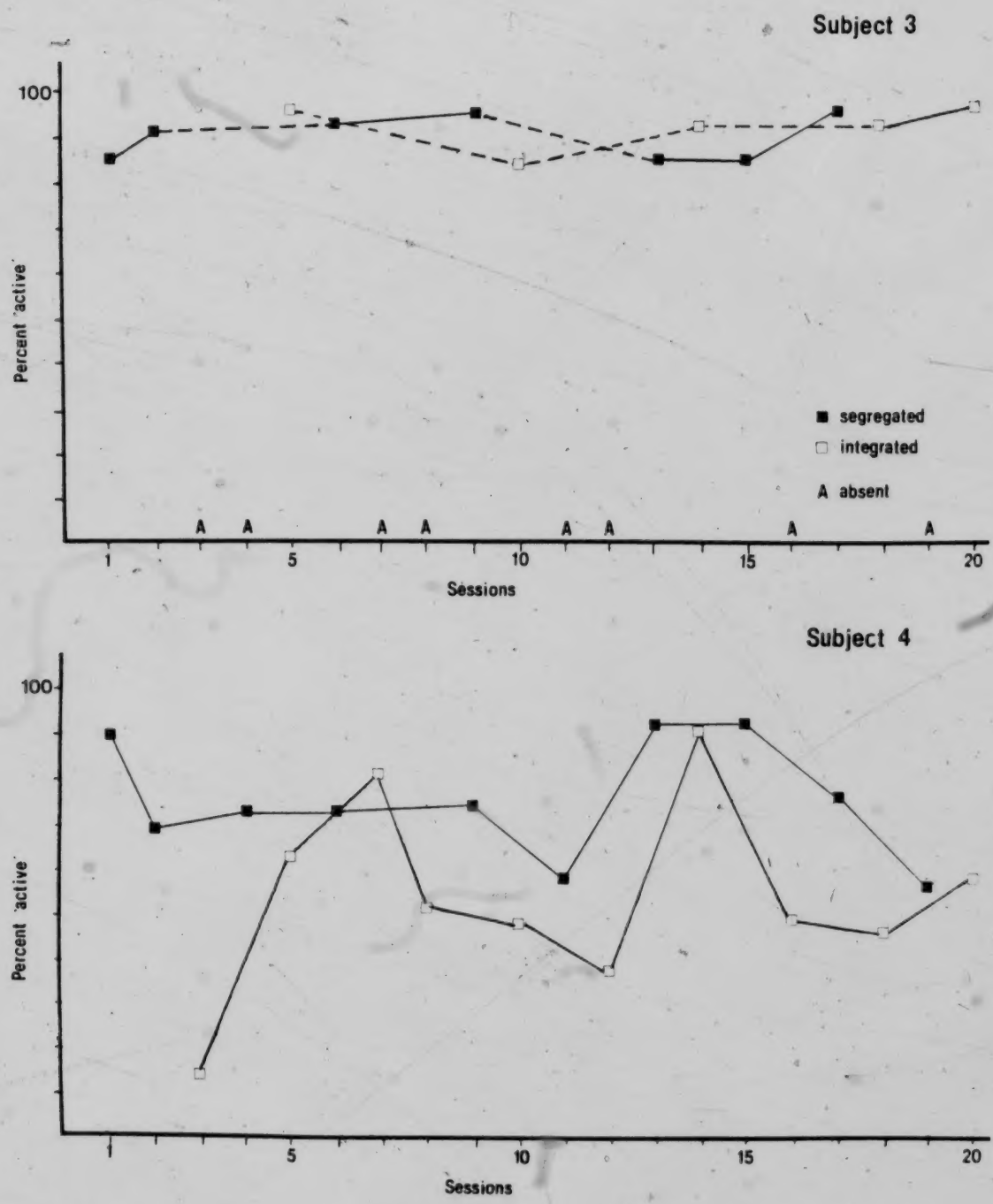

Figure 4. Average percent of observable time 'active' for Subjects 3 and 4 in segregated and integrated settings.

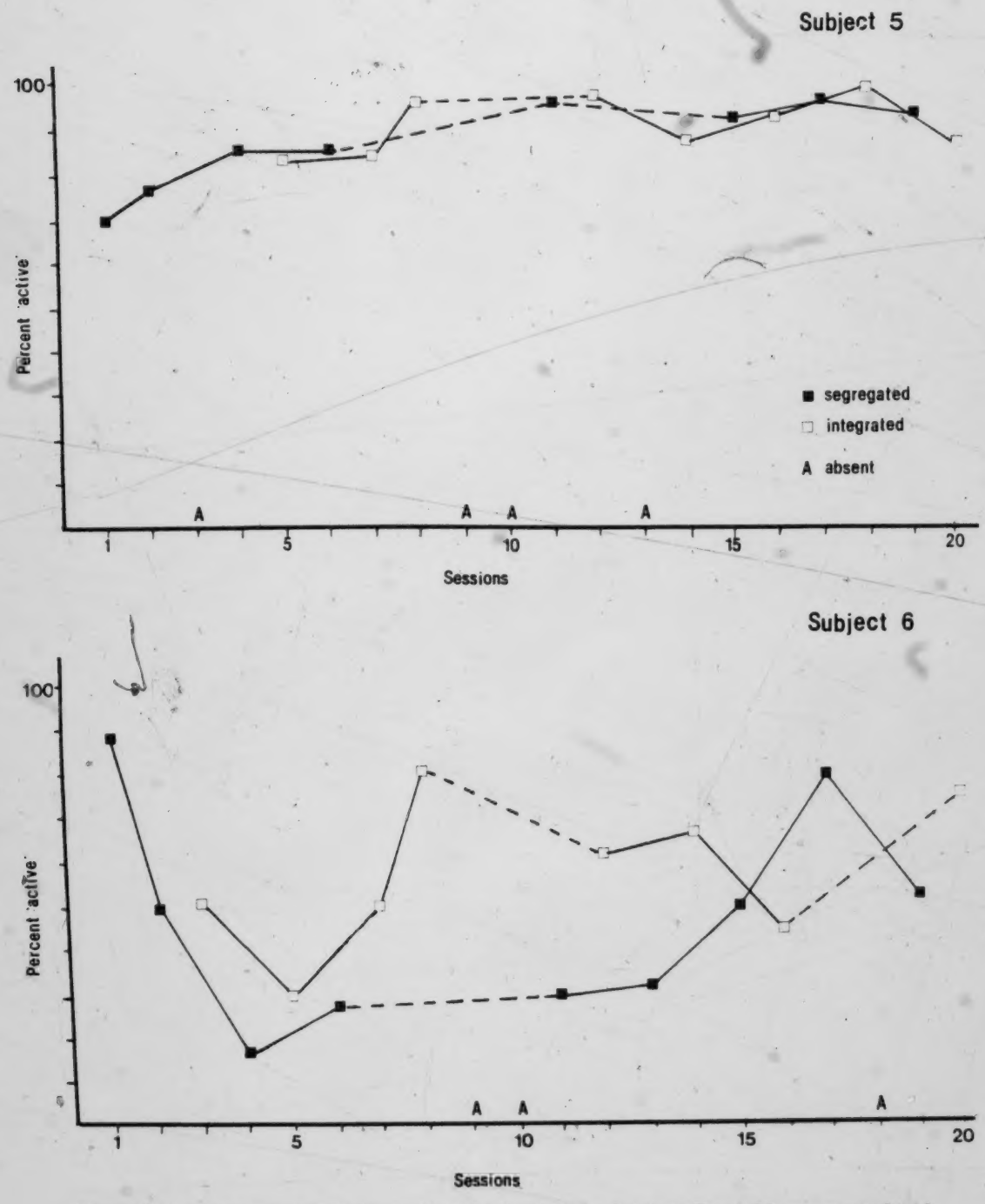

Figure 5. Average percent of observable time 'active' for Subjects 5 and 6 in segregated and integrated settings.

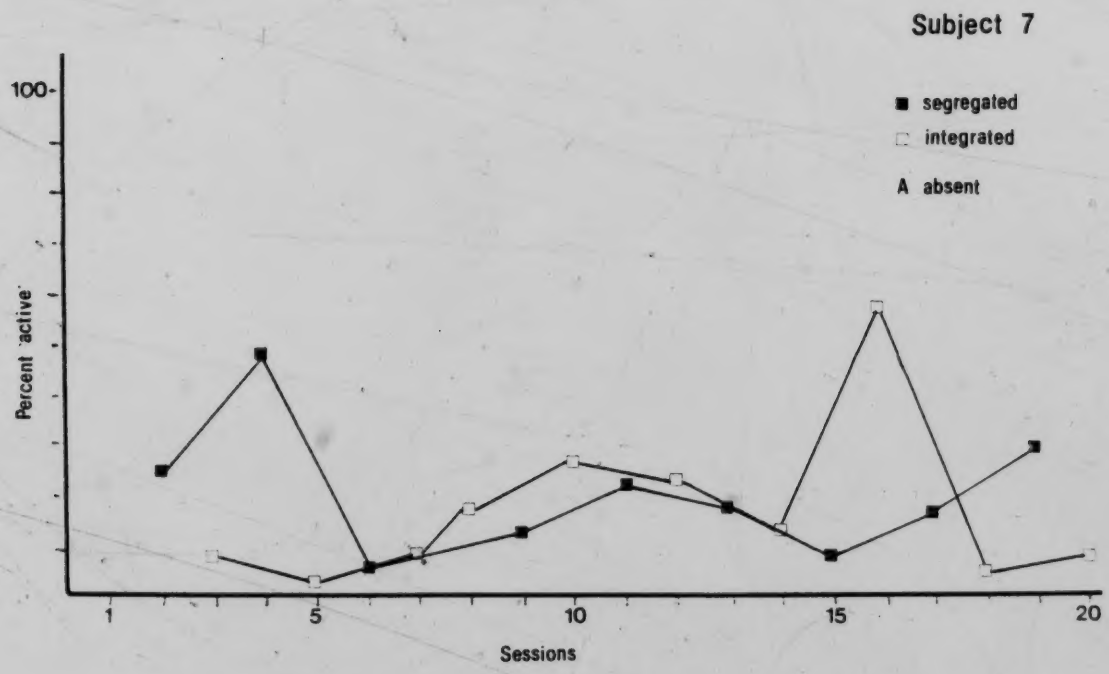

Figure 6. Average percent of observable time 'active' for Subject 7 in segregated and integrated settings.

(Figure 6) displayed a pattern of improvement in activity participation on the days involving integration. Subject 4 (Figure 4) showed a pattern of decreased activity participation during the integrated sessions. Data on all the subjects show varying degrees of variability, level and trend, and there does not appear to be an overall general pattern. Subjects 3 and 5 show high levels of activity on the majority of days and a ceiling effect may have masked any potential pattern in these data.

One of the hypotheses put forth as a benefit of integration in physical activity, is that exposure to more highly skilled peers will lead to improved skill performance. It is also assumed that improved skill performance will, in turn, lead to more active participation in the play environment. The data from this study do not generally support this assumption. Examination of the therapeutic criterion, however, reveals certain positive outcomes.

The fact that the data showed no systematic changes, is, in and of itself, a positive finding. The handicapped subjects seemed unaffected by the presence of the nonhandicapped children and basically disregarded other children in pursuit of their own activities. The nonhandicapped children were initially timid about the presence of the handicapped children in the playroom, but after a brief period of adjustment, became tolerant of the handicapped children. This apparent playmate tolerance may lay the foundation for a conducive environment for the structuring of play programs using such methods as peer imitation or reinforcement techniques.

A positive finding in terms of therapeutic criterion that is not reflected in the data is the effect of peer modelling. All of the handicapped subjects showed play behaviors or skills not previously demonstrated in their skill repertoires, which seemed to result from observing and imitating their nonhandicapped playmates. The most noteworthy of these achievements was that three handicapped subjects learned the skill of climbing up the slide from the bottom. This is definitely a culturally normative skill that would not have been taught as part of any play skill program, yet is a part of most nonhandicapped children's skill repertoires. Other skills that were often modelled were playing with hockey sticks, racquets and scoops and climbing more

complex pieces of climbing apparatus. It would seem that the handicapped subjects lacked the strategies necessary to tackle this equipment on their own. After observing the nonhandicapped children using the equipment, some of the handicapped children were able to model the skills to the best of their abilities.

General Patterns of Social Interaction

The second analysis of graphic data was to determine the overall picture of social interaction. Figures 7 to 10 depict mean values from the two 7 1/2 minute segments each day, for the length of the program. Visual analysis of these graphs reveals that for five of the seven subjects, there are no clear or consistent differences in patterns of social interaction in the segregated or integrated environments. Two subjects, subject 3 (Figure 8), and subject 7 (Figure 10) show improved levels of socialization on the days involving the integrated environment.

The negative behaviors of the handicapped subjects were also coded in this study. There were no differences found, between segregated and integrated environments, in episodes of negative interaction between any of the subjects. Two of the seven subjects showed consistent minimal levels of negative behavior, but this pattern did not change in any way between the two different environments. The other five subjects showed extremely infrequent instances of negative behavior.

Again, overall, the data from this study do not support the assumption that integration of handicapped and nonhandicapped will lead to improved social interactions. It must be pointed out that these data depict social interaction in general. That is, there is no differentiation as to whether the social interactions of the handicapped subjects were directed toward the handicapped or the nonhandicapped. Data were initially collected separately for interactions with handicapped and the nonhandicapped, but no significant increases in socialization with the nonhandicapped became apparent. Therefore, data were combined for an overall view of socialization. It was felt that the effects of integration would be positive if the

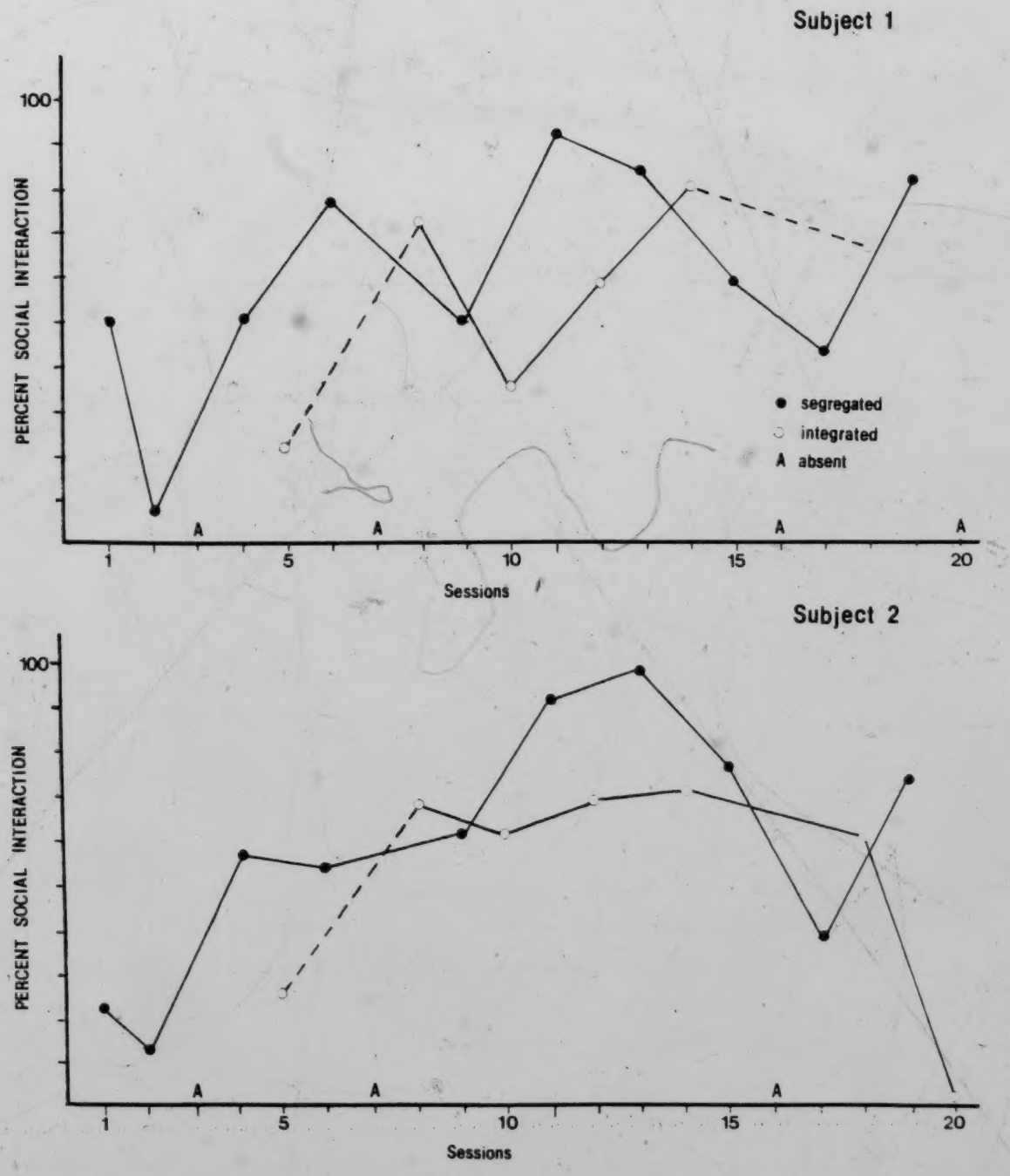

Figure 7. Average percent of observable time spent in 'social interaction' for Subjects 1 and 2 in integrated and segregated settings.

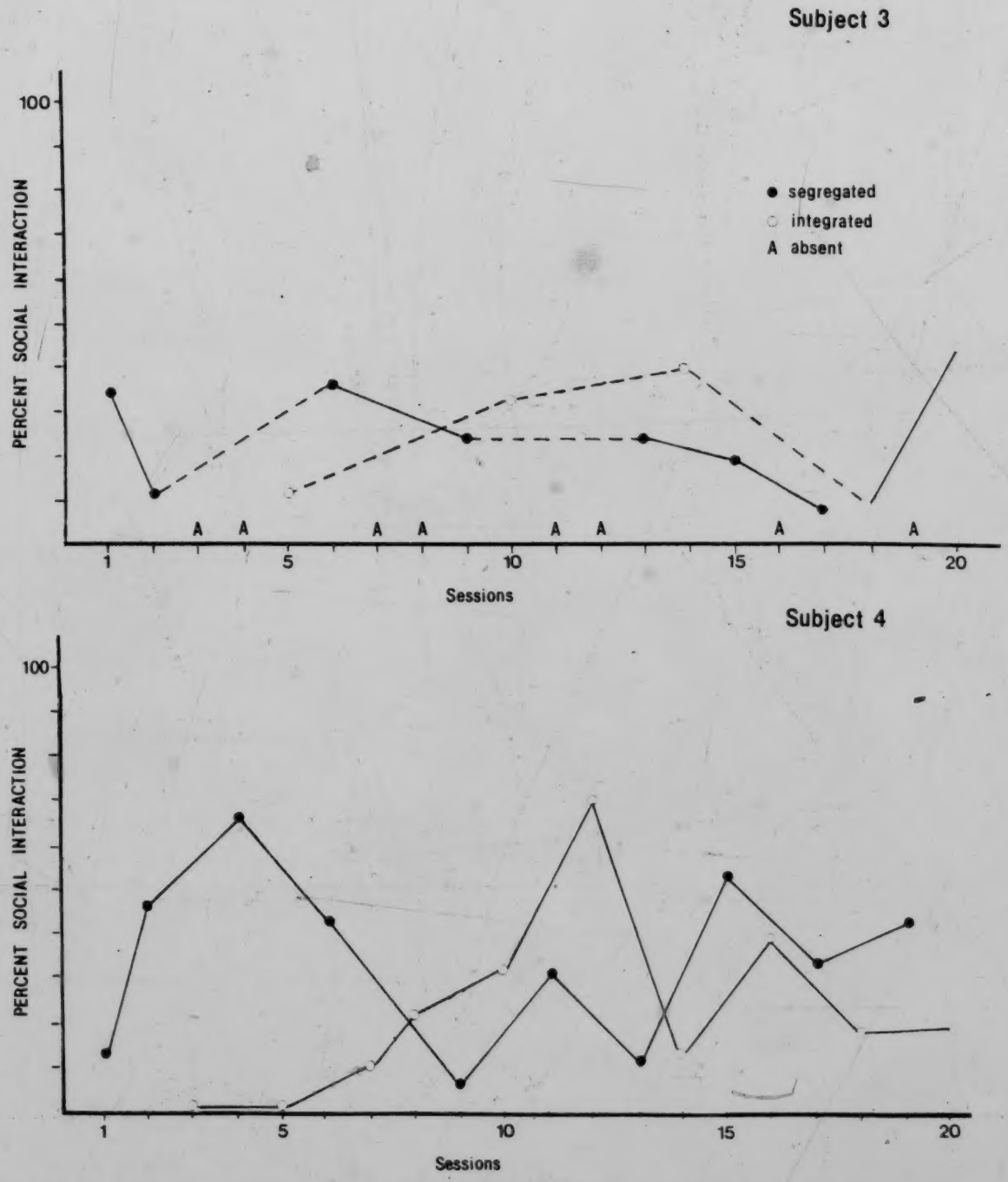

Figure 8. Average percent of observable time spent in 'social interaction' for Subjects 3 and 4 in integrated and segregated settings.

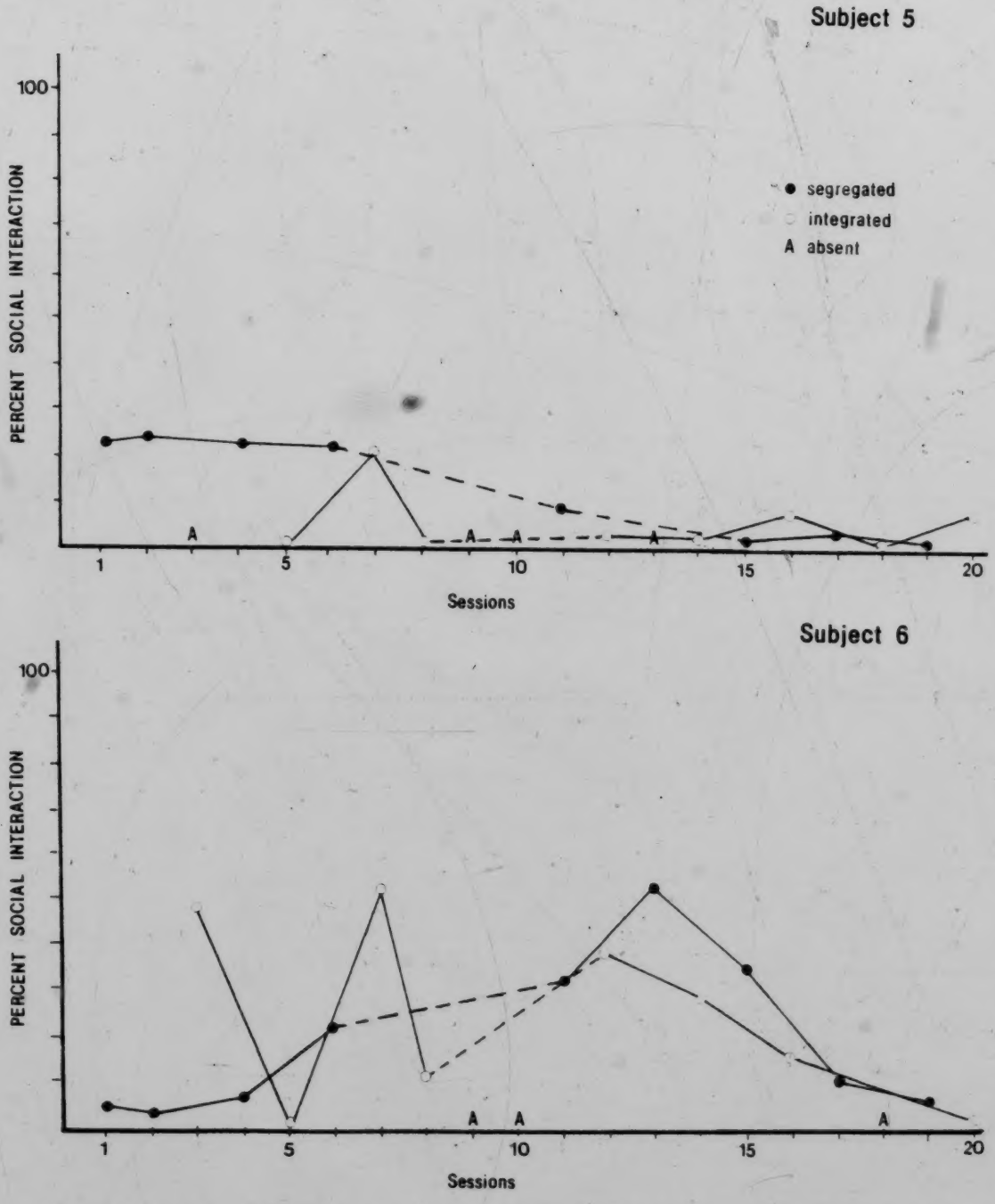

Figure 9. Average percent of observable time spent in 'social interaction' for Subjects 5 and 6 in integrated and segregated settings.

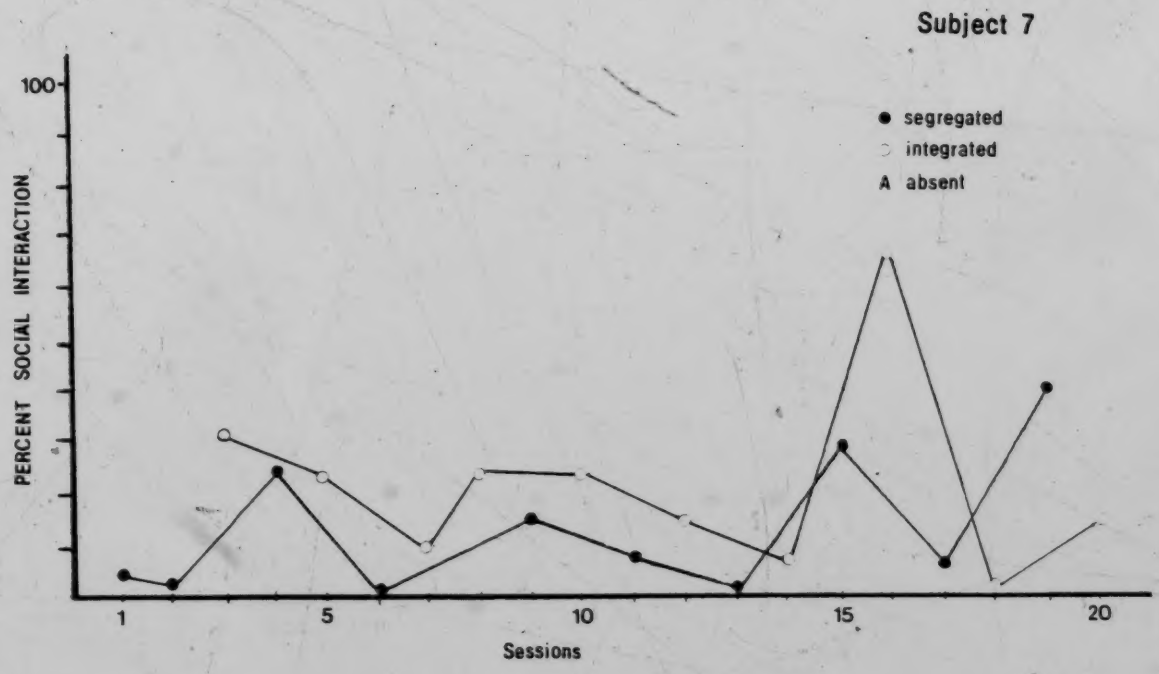

Figure 10. Average percent of observable time spent in 'social interaction' for Subject 7 in integrated and segregated settings.

handicapped subjects directed more social behaviors to other children, regardless of whether handicapped or not.

Although these data show no significant increases in social interactions during integration, this is not necessarily an undesirable finding. There appears to be an overall trend of tolerance of playmates, regardless of whom, and two subjects displayed increased levels of social interactions on the days involving integration.

Taking the therapeutic criterion into consideration, it was observed that the handicapped subjects did show the desire and motivation to socialize with the nonhandicapped. The data do not capture this, perhaps due to the simplicity of the instrument. Three subjects in particular (subjects 3, 6 and 7), showed increasing preference to associate with nonhandicapped children, as determined by subjective observations. The classroom teachers, aides and program assistants all noted the increased interaction and felt that the integrated program was responsible for this improvement. Although attempts were made by the handicapped to play socially with the nonhandicapped, they moved too quickly for the handicapped subjects. As a result, the handicapped children were unable to sustain contact for long periods of time, and would often just give up trying to 'keep up'. This process was evident in subjective observations of the program, however it was not reflected in the data.

General Patterns of Physical Activity in Specific Environments

The third analysis was an evaluation of patterns of physical activity in specific environments; that is, an environment where play vehicles were available as compared to one where play vehicles were not available. Data were collated for each subject to include both segregated and integrated environments. For this analysis, differentiation was made between environments with and without play vehicles.

The average percentage scores of active participation, for each environment, were collected and rank ordered. Figure 11 depicts box and whisker diagrams (Velleman & Hoaglin, 1981) of the range of active participation scores for each subject. Environment 1 (striped

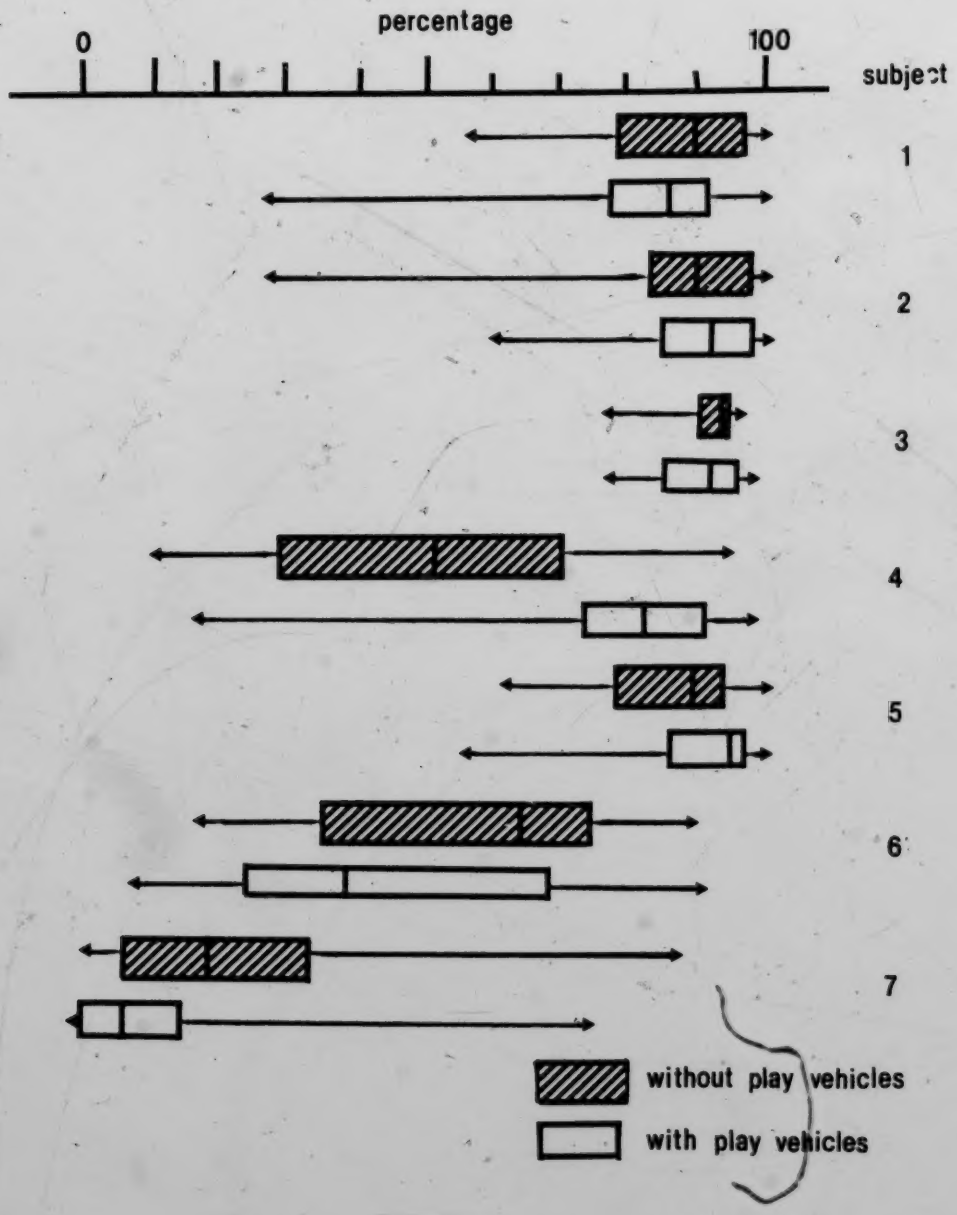

Figure 11. Box and whisker representation of the average percent of observable time 'active' for the handicapped subjects in environments with and without play vehicles. The 'box' represents the 25th, 50th and 75th quartiles, while the 'whiskers' represent the range of scores.

boxes) represents no play vehicles available, while environment 2 (open boxes), represents the environment when play vehicles were available. The 'box' represents the 25th, 50th, and 75th quartiles, while the 'whiskers' represent the highest and lowest score for each subject. This type of visual display gives a clear method of visually determining the overall effect of environment on behavior across subjects. Four of the seven subjects (subjects 1,2,3 and 5) show no discernible difference in active participation between environments. Two subjects (subjects 6 and 7) appear negatively affected by the addition of play vehicles to the environment, as evidenced by a lower overall range and median score. One subject (subject 4), appears to be positively affected by these same environmental changes.

Of the four subjects (subjects 1,2,3 and 5) that show no significant differences in performance between environments, three are the most highly skilled children in the group (subjects 1,2, and 3) and one subject (subject 5) consistently demonstrated a non-productive but high level of activity. A ceiling effect may have contributed to this finding of little difference between the two environments. The three more highly skilled subjects have a broader range of skills in their skill repertoires and are able to both adapt and utilize the additional equipment. Subject 5 constantly wandered around the playroom with little regard for equipment or other playmates. This subject did, on occasion, use the tricycles available towards the end of the program. This would be considered a positive outcome due to the environment, not because of increased activity, but because of the change in activity choice. The two subjects (subjects 6 and 7) that were negatively affected by the addition of play vehicles, were the least skilled children in the group. Subject 4 displayed an increase in activity level with the addition of play vehicles. Using play vehicles, specifically pulling a wagon, was this subject's most proficient and preferred skill. Therefore an increase in activity with the addition of play vehicles would be expected.

General Patterns of Social Interaction in Specific Environments

Similarly, box and whisker diagrams were constructed (Figure 12) using the percentage scores of social interaction for both integrated and segregated sessions and differentiating between the availability of play vehicles. A significant finding was that all seven subjects showed decreased levels of social interaction in the environment where play vehicles were available. It can be assumed then, that for these subjects at least, the presence of play vehicles is not conducive to facilitating social interaction. The assumption would be that the environment was too fast or too hectic for the handicapped children. As was stated earlier, the handicapped appeared to want to initiate socialization with the nonhandicapped children, but were unable to sustain their proximity to them because they moved about too quickly. Adding play vehicles to the environment seemed to exaggerate this effect. The handicapped children had no chance to sustain communication in such a fast-paced environment. This is an even greater problem with these moderately mentally handicapped children, who cannot communicate effectively, verbally. The general method of communication by playful gestures and modelling the actions of the nonhandicapped children, must be done in close proximity to other playmates.

Study 2

Study 2 attempted to investigate whether there were differences in equipment preference, and level of use, between the handicapped and nonhandicapped subjects.

The data from the coders checklists (see Appendix C) were transcribed to a matrix format to get a better overall picture of the interaction between equipment preference and level of use (Table 5). The results were collated and are representative of percentages of observable time that the subjects participated in each category. These figures were obtained by taking the number of subjects present each day and multiplying this number by the number of possible observable intervals, for a grand total of observable time. The score for each cell was then divided by this grand total to arrive at a proportional percentage figure that takes into account

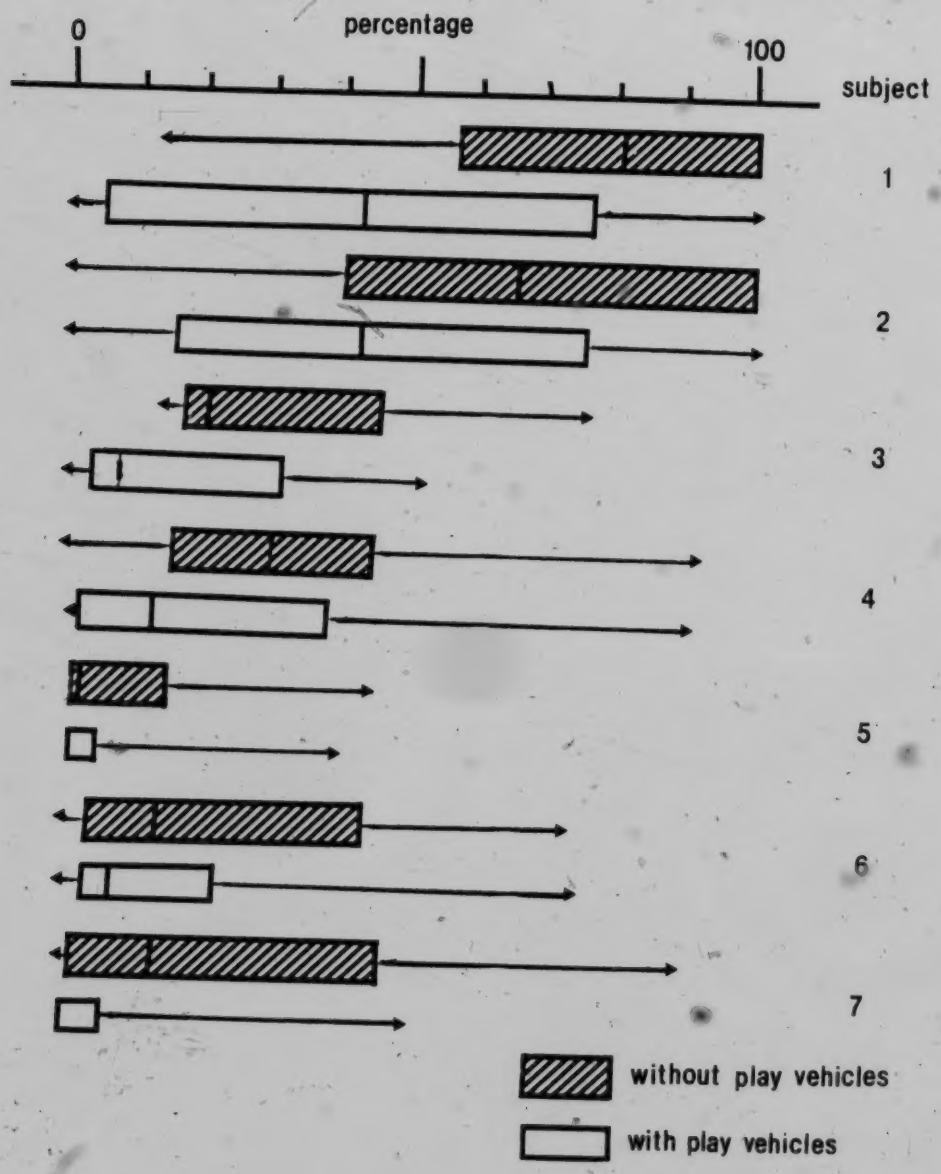

Figure 12. Box and whisker representation of the average percent of observable time spent in 'social interaction' for the handicapped subjects in environments with and without play vehicles. The 'box' represents the 25th, 50th and 75th quartiles, while the 'whiskers' represent the range of scores.

Table 5

Matrix depicting the interaction between percentage of equipment preference and level of use for handicapped and nonhandicapped subjects.

	Large Play	Small Play	Play Vehicles	No Equipment	Multiple Equip.	Total
Inactive	11.03 / 26.98	1.30 / .78	6.12 / 2.79	3.69 / 13.71	.60 / .38	22.74 / 44.37
Moderate	21.56 / 8.27	10.87 / 3.95	18.45 / 13.09	6.64 / 14.21	10.30 / 1.85	67.82 / 41.37
Vigorous	4.93 / 12.83	1.51 / 0.00		2.80 / 1.10	.19 / .07	9.43 / 14.00
Total	37.52 / 48.08	13.68 / 4.73	24.57 / 15.88	13.13 / 29.02	11.09 / 2.30	100 / 100

nonhandicapped / handicapped

differences in numbers due to absences, and intervals of non-observation, thereby making these scores comparable.

Considering the sums of the rows and columns from Table 5 (Figure 13) it can be seen that as far as equipment preferences are concerned, handicapped subjects spent nearly half of their time with large play equipment (48.08%). In terms of level of use of equipment, the handicapped subjects again spent nearly half of their time (44.37%) in the inactive category.

The nonhandicapped subjects showed a much more even distribution of equipment preference, although their highest scores (37.52%) were also found with the large play equipment. The nonhandicapped subjects spent the majority of their time (67.82%) at a moderate level of activity.

The nonhandicapped subjects also spent approximately five times more of their time with multiple pieces of equipment than did the handicapped. This was, in the majority of cases, combinations of large play and small play, (e.g. jumping on the trampoline with a ball) and small play equipment and play vehicles (e.g. riding a bike holding a hockey stick).

It appears from the sum of scores in the 'vigorous' level of activity, that the handicapped subjects spent more time than the nonhandicapped subjects at this level. As can be seen from examination of the individual cells, the discrepancy occurs in the 'large play, vigorous' cell of the matrix. This figure is somewhat misleading, because two of the seven handicapped subjects spent a large majority of their time jumping on the trampoline, which falls into this categorization. Therefore, the scores were inflated in the 'vigorous' and 'large play' categories, and it is not really an accurate representation of the performance of the group as a whole.

Other general findings from analysis of the matrix are that the handicapped subjects spent almost double the time of the nonhandicapped in the 'inactive, large play' category and the opposite finding holds true for the 'moderate, large play' category. Handicapped children spent about four times more of their time in the 'inactive, no equipment' category and twice the amount of time in the 'moderate, no equipment' category. These values combined lead to

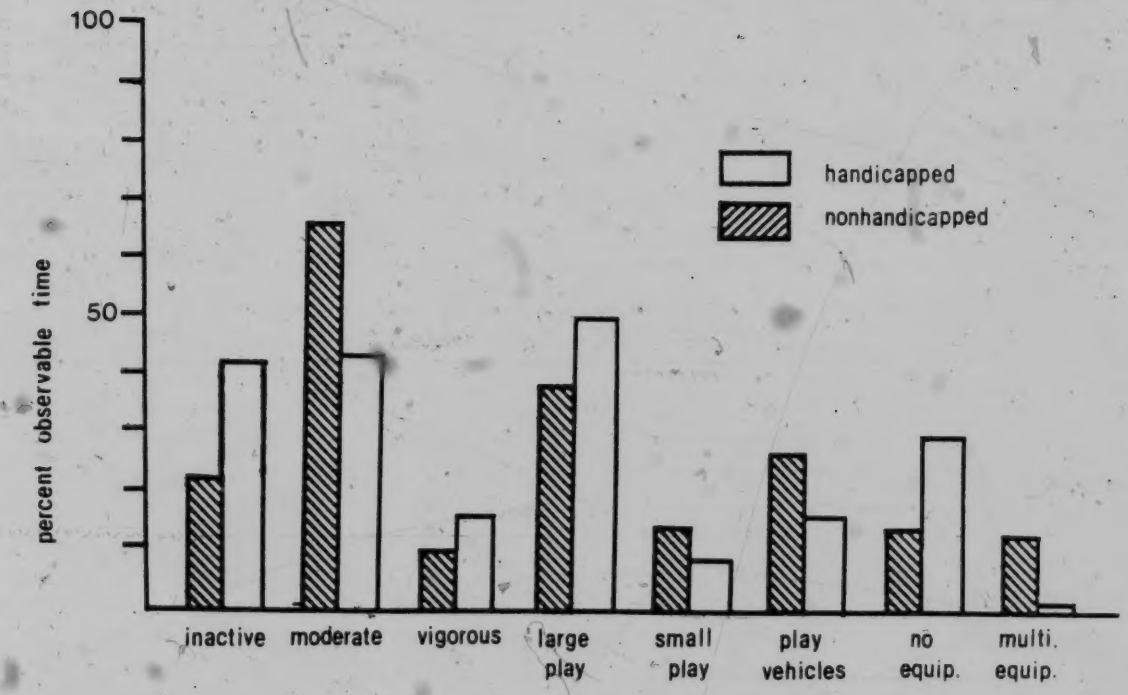

Figure 13. Group mean percentage of observable time with reference to level of activity and equipment preference for handicapped and nonhandicapped subjects.

the somewhat expected finding that the handicapped subjects spent more than double the time of the nonhandicapped subjects sitting or lying on the large pieces of play equipment, observing the rest of the group, but seldom interacting.

In summary, it seems that large play equipment is the most preferred equipment for both the handicapped and the nonhandicapped subjects, however the nonhandicapped subjects tend to use the equipment for its inherent purpose. The handicapped also do not choose to play with play vehicles and small play equipment as much as the nonhandicapped, probably due to their limited skill repertoires or the lack of opportunity to gain or maintain possession of this equipment. This may also lend support to the contention that the vehicles are not conducive to facilitating social interaction with these handicapped subjects. Neither the handicapped nor the nonhandicapped subjects showed a preference for small play equipment. The handicapped subjects are rarely able to incorporate more than one piece of equipment at a time in their play behaviors.

An important and often overlooked evaluation in applied research is social validation (Kazdin, 1982). Broadly defined by Kazdin, social validation refers to evaluation of the social acceptability of intervention programs. This evaluation would include examination of the focus, procedures and behavior changes that occur as a result of the program.

Two methods of assessing social validation are generally employed, social comparison and subjective evaluation. Social comparison examines the behavior of the subjects, before and after treatment, against the behavior of 'nondeviant' peers. Subjective evaluation involves the evaluation of the subject's behavior by individuals who are regularly in contact with the subjects to determine whether the behavior change is important (Kazdin, 1982).

In order to try to establish subjective evaluation of behavior change as a result of the integrated and segregated free play environments, a questionnaire was given to the teachers and aides from the two classrooms present (see Appendix C). Questionnaires were given to the preschool instructors for the daycare group, though no response was received. This probably occurred because the preschool teachers were not present for any of the program sessions, and

therefore, were unable to comment from firsthand observations of the integrated program.

All of the classroom teachers and aides felt that the integrated environment was more stimulating and the students benefitted positively from the interactions. The teachers said the children were more expressive and exhibited more purposeful behavior on the integrated days of the program. According to the teachers, most of the children modelled well and made attempts at interacting with the nonhandicapped children. It was felt that the lower skilled children in the group would definitely require more of a structured program, in order to benefit from the presence of nonhandicapped models. The age of the nonhandicapped subjects seemed appropriate, as far as the teachers were concerned. They felt that the nonhandicapped children were well skilled but displayed behaviors that were not too far advanced for the handicapped children.

The results described in Study 2, in effect, provide a form of social comparison. By definition, social comparison examines the behavior of subjects against nondeviant peers, before and after treatment. Since the intervention was continous, comparisons may be made throughout the course of the study, in terms of equipment preference and level of equipment use, between the handicapped and nonhandicapped subjects.

Chapter V

Discussion

Patterns of Activity and Social Interaction

It seems apparent from Study 1 that, in general, there were no systematic changes in the mentally handicapped subjects' activity pattern when the nonhandicappedsubjects were present in the playroom. Visual inspection of the data revealed a positive pattern for two subjects (Subjects 6 and 7) and a negative pattern of activity participation for one subject (Subject 4) on the days involving integration. There were no exaggerated patterns among any of the subjects however, and activity performances on both integrated and segregated days were remarkably similar.

In examining the subjects' performances individually, it is noteworthy that the two subjects who showed improved performance during integrated programming, were both average in physical appearance. Subject 7, a Down's Syndrome child, was physically appealing, small in stature, and had an extremely amicable personality. Subject 6 was an extremely appealing child who, at first glance, did not display any of the perceived stereotypical behaviors of the mentally handicapped. These subjects, being more similar to the nonhandicapped subjects than any of the other handicapped participants, were perhaps more readily accepted into the integrated program. It has been suggested that younger children may be more tolerant of individual differences (Apolloni & Cooke, 1978; Wylie, 1975) and once the handicapped child reaches school age, he or she is even less likely to be accepted by peers (Peterson & Haralick, 1977; Snyder et al., 1977; White, 1980). The present findings, though limited to a few subjects, however, would be congruent with the findings of Siperstein and Gottlieb (1977). Briefly reiterated, their findings suggested that with grade 4 and 5 students, children who looked different physically, were perceived as being incompetent. It is conceivable that this physical stigma may be prevalent even at this young age. This may have tremendous negative implications in a physical activity setting for a child who does not assimilate easily because he

or she is physically different and who also has lower skill levels than the rest of the class. Both physical appearance and physical performance are immediately and distinctly apparent. Obviously, physical appearance cannot be altered so it is important that levels of performance competence be improved in physical activity settings. Skill upgrading and extra guided practice time may contribute to more successful integration. In the present study, the alternate integrated sessions were effective in allowing for the extra practice time necessary to achieve a better understanding of the concepts or skills involved in the cooperative game segment. During the segregated session, instructors were able to give attention to the children who required more assistance.

In terms of social interaction, again, there was no general evidence of a systematic pattern for the mentally handicapped subjects in either segregated or integrated free play environments. This finding is consistent with studies of social integration, previously discussed. These suggest that social interaction can occur between the handicapped and nonhandicapped, but that social isolation (Guralnick, 1981b) or the preference of the nonhandicapped for other nonhandicapped children as playmates (Guralnick, 1980; Peterson, 1982; Peterson & Haralick, 1977; Porter et al., 1978) may also be evident. No detrimental effects were evidenced in this study. This is an important finding since there have been suppositions made suggesting that, in integrated settings, handicapped children may be overtly rejected by their nonhandicapped peers.

It has been suggested that for effective and cooperative social interactions to occur, expressive language may be a prerequisite (Wasson, 1980). The handicapped subjects who gained the most from the integrated activity in terms of activity participation and social interaction (Subjects 3, 6 and 7), were also the best able to communicate, however not necessarily in the conventional sense. Two subjects (3 and 7) showed a more consistent positive increase in social behavior for the sessions involving integration. Subject 7 was previously described as being physically similar to the nonhandicapped subjects. Although this subject had extremely minimal verbal ability, he was able to communicate by laughing and playful gestures

and vocalizations. Social interaction took the form of chasing and following games. Subject 3 was average looking in appearance, although was larger in stature than all of the other program participants. This subject, however, was the most verbal of all the handicapped children. Due to the size of this subject, the nonhandicapped children were somewhat intimidated by him, and socialization was also primarily chasing and following games.

It may be logical to assume that if nonhandicapped children initiate interactions that are continually not reciprocated (due to minimal verbal abilities of the handicapped child) the motivation to continue those interactions would soon be extinguished. Social reinforcement contingencies are necessary. Leiter's (1977) work with nonhandicapped preschoolers would lend support to this contention. One of the main findings from Leiter's study was that reciprocity of social interactions in play groups was partially maintained by social reinforcers within the initiation/ response dyad. Social cooperation, or responding to the suggestion initiated, was found to be the best positive reinforcer.

In the case of subject 7, even though his physical size may have been intimidating to the smaller nonhandicapped children, there was still a type of reciprocity which, in turn, made this type of interaction a game. In the case of subject 6 and 7, minimal verbal ability was apparently overlooked as these children were similar enough to associate with.

These three subjects, who were more successfully integrated (subjects 3, 6 and 7), were all able to reciprocate in some way and this reciprocity was accepted by the nonhandicapped children. Wasson (1980) has suggested that for the organization of cooperative social interaction with nonhandicapped children, gestures are not used but rather expressive and receptive language. Without language this organization is extremely difficult to coordinate. Findings from the present study seem congruent with these ideas, as the level of play did not have a cooperative focus. The fact that reciprocal play persisted, however, is a source of optimism.

Porter et al. (1978) have suggested that simultaneous manipulation of different objects is also related to social play, in that it may be an integral form of parallel or group play. Their

findings revealed a greater mean frequency of simultaneous manipulations of different objects by nonhandicapped preschoolers. Decreased levels of simultaneous manipulations in the handicapped may indicate a related deficit in social skills. The authors suggested that "the low rate of social play-like behavior by retarded children may be somewhat a function of their inability to emit appropriate signals to another child or to interpret signals given by others" (p. 322). Similar findings were noted in the present study in that the handicapped subjects spent a mere 2% of their play time incorporating multiple pieces of play equipment, while the nonhandicapped children used multiple pieces 11% of their time.

It would appear that successful integration in physical activity settings may be intimately related, at least in part, to the interrelationships of depth of skill repertoire, level of performance, acceptability of physical appearance and language capabilities.

Equipment Preference and Use

Large play equipment was favoured by both the handicapped and the nonhandicapped subjects. Small play equipment was not a strong preference for either the handicapped or the nonhandicapped. From subjective observation, it was noted that equipment such as hockey sticks and scoops were used more by the nonhandicapped, while balls and bean bags were preferred by the handicapped. Much of the time, however, the small play equipment was not used for its inherent purpose. It would seem that a possible hypothesis for this occurrence may be that the handicapped lacked the appropriate skills for use of much of this equipment, and the nonhandicapped were not interested in using small play equipment because it was less appealing than the majority of other equipment available to them in the PREP playroom.

Play vehicles, when available in the free play environment, were chosen by the nonhandicapped subjects approximately 25% of the time and by handicapped subjects, 16% of the time. The lower proportion of time evidenced by the handicapped subjects with this equipment, especially tricycles and scooters, may be due to their lower skill levels with this equipment. Further, since vehicles were valued play equipment, perhaps some of the

handicapped subjects were not aggressive enough to gain and maintain possession of this equipment. The play vehicles were not often shared spontaneously.

Behavioral differences in environments with and without play vehicles were apparent. In terms of activity levels, no apparent overall effects were found, with one exception. Subject 4 showed higher levels of participation during the sessions with play vehicles. As previously mentioned, this was primarily because this subject consistently preferred to play with a wagon over other play equipment. With respect to social interaction, the introduction of play vehicles appeared to negatively affect the social interaction of all seven subjects, in terms of range and median scores. It would seem that the introduction of play vehicles initiated a faster-paced environment that negated the possibility of social interaction for the handicapped subjects. The handicapped subjects, in terms of verbalization and mobility, possessed fewer skills that would enable them to participate successfully in such an environment.

Environmental Suitability

This study was implemented using equivalent numbers of handicapped and nonhandicapped children in the activity program. In the past, some researchers have advocated integration with equal numbers of handicapped to nonhandicapped (Field et al., 1981; White, 1980) and a majority of recent studies have investigated integrated programs employing approximately equal numbers (Dunlop et al., 1980; Field et al., 1982; Peck et al., 1978; Peterson, 1982; Peterson & Haralick, 1977; Porter et al., 1978). The findings from these studies, with respect to positive increases in socialization levels, are varied although no negative results are apparent. These investigations, although conducted in integrated free play environments, were not concerned with skill or activity outcomes.

Using equivalent numbers of handicapped and nonhandicapped in the present study was successful, especially in regard to the cooperative game and station activity elements of the activity program. There were enough skilled models for observation as well as enough familiar peers, for both groups of subjects. As mentioned previously, it is not possible to determine

from this study whether the same type of behavioral responses would occur with a different group ratio. Given the environment of the present study, it was possible, through the group game and station activity, for the handicapped and nonhandicapped children to interact more comfortably in small, informal situations.

The familarity of the environment is an important consideration for both the handicapped and nonhandicapped. The environment chosen for this study was one equally familiar to both groups. All of the participants had previously experienced both the facility and the play apparatus with their respective class groups, before being brought together for this study. Therefore, adaptation to the new environment was minimal and both the handicapped and nonhandicapped children could feel confident in the use of the equipment available to them. This is an important factor in activity programming and it may allow for a more realistic perspective of integration. If children are not confident or feel uncomfortable with an unfamiliar surrounding, behavior may be adversely affected.

It was felt that if the handicapped were given the advantage, in terms of familiar peers and environmental conditions, a better understanding of the integrative process could be developed. Once this is established, then specific and effective teaching strategies for integrated programming could be examined. Apolloni and Cooke (1978) suggest that:

> when handicapped children are accepted by and interact with their nonhandicapped classmates, more structured forms of teaching between children can readily be organized. Such interactions should also be beneficial to the nonhandicapped children as well, by providing them with opportunities to develop sensitive and well informed feelings of acceptance for human diversity (p. 159).

Perhaps one way to facilitate integration, at least in a child's early years, would be to employ equal numbers of handicapped and nonhandicapped children in a preschool program. It is hypothesized that minimal adverse effects would be suffered by either group. Then, in the school years, when handicapped children are usually mainstreamed individually, or at a small

ratio, all children may be more tolerant of the situation and both groups better able to deal with the transition.

Program Effectiveness

The teachers of the mentally handicapped felt that the alternating conditions design was an acceptable means of introducing integration. All of the teachers indicated that they would prefer to have their future involvement with integrated programs organized in this manner.

The cooperative games and station activity segments of the program were implemented successfully. Both activities gave the handicapped an opportunity to interact in informal group situations. Elements of group work, such as cooperation, sharing, waiting for turns, and modelling, were involved. Both the handicapped and nonhandicapped learned to use, to some extent, all of these valuable group skills.

Information gained from both the teacher questionnaire and from general discussion indicated that all of the classroom teachers and program instructors felt that the integrated program was beneficial to the handicapped subjects, and that in most cases, the children were able to benefit positively both from exposure to and interactions with the nonhandicapped children. This is noteworthy, since data do not overwhelmingly justify these perceived benefits. It may be that the instrument was insensitive to subtle social and skill benefits, or that teachers were biased by one or two overt positive benefits and thus generalized these to the group as a whole. The research design allowed for skill upgrading and practice to be available to the mentally handicapped children on alternate days. The teachers may have noted positive effects in terms of improvement in skill level or skill acquisition, which contributed to their positive perception of the program on the whole. These variables were not measured in this study.

It was apparent from observing Study 1, that an initial adjustment period was necessary, for both the handicapped and nonhandicapped children, even in this familiar environment. The handicapped children seemed, initially, to be overwhelmed by the presence of the nonhandicapped subjects. Then, after growing accustomed to the new environment, the

handicapped subjects began to model and interact. The nonhandicapped subjects, similarly, seemed to go through an adjustment phase, then began to interact, to some extent, with the handicapped. Toward the completion of the study, more frequent interactions, initiated by both the handicapped and nonhandicapped children, occurred. Since duration of interactions and not initiation of interactions was being measured in this study, this finding was not clearly reflected in the data. The mentally handicapped subjects could not sustain interactions for long periods of time both due to their low verbal capabilities, and problems in keeping up in the faster paced environment.

Therefore, when structuring an integrated program, it is necessary to allow a few sessions of unstructured free play, initially. This would give all the participants an opportunity to become more familiar with each other. Once this adjustment has been made, then the participants may be more receptive to a structured activity program.

Data on equipment preferences and level of use by both the handicapped and nonhandicapped in an integrated environment are important both for the structuring of play programs and the purchase of equipment. Large play equipment, being favoured by both the handicapped and nonhandicapped, would be ideal to begin with in an integrated play program. Large play equipment may be versatile enough to challenge the nonhandicapped and stimulate appropriate use for the handicapped. An important consideration, in the purchase and use of equipment, is whether the equipment and the child's size are proportional. Mentally handicapped children are often integrated into programs where the nonhandicapped children are younger, on the average. The skills the mentally handicapped possess may be suitable for younger age group activities, however, the equipment may be designed for physically smaller children. Therfore, some equipment adaptations may be necessary. It is important that the instructor be wary of choosing equipment for the integrated group that is developmentally suited to the handicapped but not age-appropriate. Therefore the instructor must be concerned with equipment size as well as its suitability to the age and skill of the mentally handicapped child. Large play equipment is generally more adaptable to broader ranges of skill differences

and age differences.

Since small play equipment was not found to be largely favoured by either the handicapped or nonhandicapped subjects, it would appear logical that small play equipment be introduced into the integrated environment in a structured manner. This would include skill instruction for both the handicapped and nonhandicapped children. This type of equipment would be ideal for peer modelling techniques of instruction, with the nonhandicapped demonstrating appropriate use to the handicapped. It was observed in this study, that the handicapped subjects demonstrated they were capable of observational learning by modelling the actions of the nonhandicapped children using small play equipment. Perhaps if intervention was also introduced in the form of a program of skill modelling, then small play equipment skills could be developed in both groups of children. It should be noted that this modelling also occurred spontaneously with other skill activities, for example climbing up the slide from the bottom. This would be congruent with Bricker's (1978) observation that modelling the object-relevent play of nonhandicapped children by handicapped children may be the basis for a better instructional medium than teacher instruction alone. It would seem that if this modelling is occurring without prompting in the free play environment, that structuring programs to include this type of peer teaching may be potentially successful.

Consideration should also be given to the findings of Scholtz and Ellis (1975). Their results, with nonhandicapped preschool children, indicated that children's preference for simplistic play equipment declined with repeated exposure. This decline occurred at a much faster rate than when the children were repeatedly exposed to a more complex play environment. As a result of this decreased interest in the play environment, the children's preference subsequently transferred to their peers.

Findings from the present study showed some indication of this type of phenomenon. A more rapid decline was evident in the nonhandicapped who, as a group, appeared to lose interest in the environment toward the end of the ten sessions that they participated in. It was obvious, at this point, that more structure was needed. The nonhandicapped subjects' levels of

aggressive social behavior seemed to escalate. This 'saturation point', for the handicapped subjects, appeared to be more individual in nature, though their limited skill repertoires had, in most cases, been exhausted by this time. The handicapped subjects then appeared to spend more of their time in idle activity.

It may be advisable then, to initially keep the play environment simple in complexity, with a limited amount of large play apparatus. This would be particularly beneficial for the handicapped since their skills tend to be more suited to large play equipment. When the nonhandicapped begin to lose interest with the environment, this may also be the point where they would be more accepting of cooperating with their handicapped peers. At this time, small play equipment or structured group activities could be introduced. Introduction of novel stimuli, such as this, may then hold a greater attractant value for both the handicapped and nonhandicapped.

From a different viewpoint, Distefano and Brunt's (1982) observations regarding complexity of environment, also have practical implications in an activity setting. Perhaps the addition of play vehicles to the playroom was sufficient to increase the complexity of the environment. It may be hypothesized that the handicapped subjects were unable to deal with the increased environmental stimuli and reacted by withdrawing into observer roles.

A further consideration for activity environment structure may be based on the findings of Grazma et al. (1972), in terms of possession, saturation and overflow. Patterns of equipment preference may have been affected by the use of other handicapped children or nonhandicapped children. Handicapped children may have been hesitant to choose certain equipment because the nonhandicapped children had active possession of it, or vice versa. Teachers should encourage use of a variety of equipment by all the program participants. Station activities would assist in implementing this by enabling the children to become familiar with and have practice time on a variety of equipment.

It has been suggested by Wehman (1976) that a taxonomy of play materials may be developed. By separating materials in terms of potential function, teachers may be more aware

of the type of toys to encourage for each child, depending on his or her developmental level. Wehman cites an early example of such a taxonomy using play materials, however, it would be potentially beneficial to develop one for play apparatus. The taxonomy should be developed, not only in terms of specific skill development but also the potential social role of the equipment (e.g. Quilitch & Risely, 1973; Poling, 1976). Further research is needed in this area.

Program Implications

The research questions in the present study were primarily concerned with the unstructured free play aspect of the program. Despite this focus, many other encouraging program findings may be noted, from a subjective viewpoint. One optimistic finding was that it is possible to accomodate children with diverse levels of social and skill development in a physical activity program.

As previously mentioned, the alternate integrated and segregated environments allowed for that essential extra skill practice time for the mentally handicapped children. In keeping with this type of program design, the handicapped children should be allowed differential amounts of segregated activity sessions in relation to integrated sessions, depending on skill and social levels. In a regular activity program, it is assumed that there is a bandwidth of motor performance that encompasses the range of skills for any given group of nonhandicapped children. It is imperative that the majority of the mentally handicapped child's skills, particularly motor skills, reach at least the minimal acceptable levels of performance in comparison to the nonhandicapped group with whom he or she will be integrated. As motor skill and social levels improve, then participation in an increased number of integrated sessions, or total integration, may be feasible. Skill upgrading, during segregated sessions, would then be an essential aspect of this program design. If handicapped children are given regular opportunity to be included in intelligently structured integrated programs, it should soon become apparent which children would benefit the most and their rate of integration may be increased.

Strichart and Gottlieb (1975) have demonstrated that increases in level of competence in the mentally handicapped are related linearly to the amount of peer imitation by the nonhandicapped. Further, competence may be generalized to other skills. Once mentally handicapped children have demonstrated skill competence in some areas, then teachers may facilitate the process by overtly demonstrating or emphasizing areas where the mentally handicapped child has skill, in specific tasks or group activities.

Observations from the present study indicate that integrated environments may be capable of inspiring skill modelling and other appropriate social behaviors, from some handicapped subjects, without teacher intervention. The opportunity to interact with nonhandicapped peers may accelerate learning effects, in some instances, and it does not appear to hinder the process of participating.

The integrated activity session provides an ideal environment for teacher directed learning, in terms of both individual and group instruction. Peer teaching and modelling may also be successful, once a tolerant or accepting atmosphere is established. The physical activity environment may be ideal for improving range and depth of skills, social interactions and language skills.

For example, in the PREP approach to individual instruction teacher guidance is faded within a multi-level prompting continuum. Appropriate use of this strategy enables the teacher to consistently adjust the balance between necessary assistance and allowing the child to perform a task as independently as possible. It is applicable for both pre- and post-response. The PREP prompting continuum, at the lowest level, involves complete physical manipulation and at the highest level, involves environmental prompts with little teacher intervention. Engaging the assistance of a nonhandicapped child would seem to complement the intention of this model. Nonhandicapped children could be used as skill models, either for partial or complete skill demonstration. It would also seem appropriate to incorporate a nonhandicapped peer model into the highest, or 'environmental', level of prompting. The teacher may initially manipulate environmental conditions so that the desired response is obtained. A

nonhandicapped peer may then be prompted to involve the handicapped child in the appropriate skill or activity. Alternately, a group of nonhandicapped children may be asked to engage in the desired skill or activity with the intent of involving the handicapped child without verbal prompting by the teacher. The highest level in the continuum involves the child initiating the task on his or her own. A nonhandicapped peer may be prompted, at this point, to join into the skill or activity with the mentally handicapped child as a form of peer reinforcement.

Integrated programming in physical activity is also conducive to development of language and social skills. Social pursuits such as cooperative games or small group activities may be emphasized. Language related to skill, or body awareness and movement, or body parts, may be stressed in any physical activity setting. The involvement of more highly skilled models, motorically, socially and verbally, may increase the benefits from physical activity programs for the mentally handicapped.

Careful consideration should be given to the variables, previously discussed, that may affect the success of integration. Once a more accepting foundation exists, then it would seem that many instructional models may easily be incorporated in integrated environments. This is noteworthy in light of the concerns of teachers faced with the difficulties of managing an integrated activity program.

Chapter VI

Summary, Conclusions and Recommendations

Summary

The purpose of this study was to examine the behavior of moderately mentally handicapped children in integrated and segregated programs. Seven subjects, aged 5 to 10 years, were observed during unstructured free play to determine if they would benefit from placement in physical activity programs with nonhandicapped children. Socialization, activity participation, equipment preference and level of equipment use were the dependent variables examined. The presence or absence of play vehicles, in these environments, was also investigated to determine whether this play equipment would further affect behavior. An alternating conditions design was implemented across a period of 20 sessions and data were collected during free play time in each session.

Results from this study showed no group trend and therefore generally do not support the assumption that exposure to integrated programming will increase activity participation or social interaction in the mentally handicapped. Gains from integration appear to be individual in nature. The fact that the data do not show systematic effects is, however, considered a positive finding.

Activity participation did not appear to be affected by the presence of play vehicles in the environment, although significant negative effects on social interaction levels, in all subjects, were found under this condition.

In comparing levels of equipment use and equipment preference between the handicapped and nonhandicapped subjects, differences were evident. The handicapped subjects spent nearly half of their time with large play equipment (48.08%) and in the 'inactive' participation category (44.37%). Nonhandicapped subjects also showed preference for large play equipment (37.52%) and they spent a majority of their time at a 'moderate' level of activity (67.82%). The nonhandicapped chose to play with play vehicles more than the

handicapped, but neither group showed a strong preference for small play equipment.

Conclusions

As a result of this study of young moderately mentally handicapped children's participation in segregated and integrated free play programs, a number of conclusions may be drawn.

1. Five year old nonhandicapped children can be integrated in an activity program with 5 to 10 year old mentally handicapped children, in equal numbers, without adverse effects.
2. Activity programs that include station activity and a cooperative group game are appropriate for integrated programs with handicapped and nonhandicapped children.
3. No systematic effects were evident when moderately mentally handicapped children were exposed to nonhandicapped children in a play program, in terms of activity participation and social interaction.
4. The presence of play vehicles in an activity environment appears to evoke significant negative effects in social interaction in young mentally handicapped children.
5. Mentally handicapped and nonhandicapped children display differential rates of equipment preference and level of equipment use in free play. Moderately mentally handicapped children spend approximately half of their free play time with large play equipment and a similar amount of time in an inactive role. Nonhandicapped preschoolers spend approximately one-third of their time using large play equipment and two-thirds of their free play time at a moderate level of activity.
6. From a subjective viewpoint, it appears that some moderately mentally handicapped children are capable of modelling certain social and motor skill behaviors of the nonhandicapped children with no teacher intervention, in a free play environment.
7. It is possible to accommodate children with diverse levels of social and skill

development in an integrated physical activity program.

Recommendations

Owing to the lack of research with regard to integration in physical activity, there is a myriad of potential research areas that require attention. The following recommendations are limited to suggestions for further research that are pertinent to the findings of this investigation.

1. Researchers should examine the efficacy of implementing a similar integrated play program in a more typical environment, i.e. in the school facility, with a small number of mentally handicapped children integrated with a larger group of nonhandicapped children.
2. The instrument used to measure activity participation and social interaction should be reexamined. Momentary time-sampling may prove to be a more efficient method of obtaining similar decriptive information since more detailed behavior response categories may be identified. An elaboration on the individual categories may provide more information in regard to behavioral patterns of moderately mentally handicapped children in integrated activity programs.
3. Researchers should explore more fully the extent to which videotape cameras may be used for data collection in free play settings. They are valuable research tools with numerous potential applications in this area.
4. The social nature of a variety of play equipment should be more thoroughly examined in light of the significant influence found with play vehicles in this study.
5. The OS-3 Event Recorder should be more fully investigated as to its potential for adapted physical activity research. This instrument would have many practical applications, especially in regard to recording behavior in field situations, for example, observing a program operating in a school or community facility. It is portable and unobtrusive to employ. General decriptive statistics are readily

available and data may be interfaced directly into a main computer terminal. Further, there is relatively little training involved in understanding its operation.

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Appendix A: Observer Training Information

Coding Rules - Study 1

Coding Rules - Study 2

Operational Definitions - Study 2

Coding Rules - Study 1

1. When a child goes temporarily out of view, count for 2 seconds (one, one thousand, two, one thousand), then turn all toggle switches off and the 'unobservable' toggle switch on, simultaneously.
2. The only exception to rule 1 is if a child is out of view because he/she is on the blue foamy mat (under the arched climber). Code the child as 'inactive' until he/she is in view again.
3. If the child is only partially in view, continue to code in the same category for as long as it is clear that the category has not changed.
4. Do not code any interactions that occur with adults.
5. If the child is being disciplined by an adult, code as 'negative' social behavior.
6. When 'negative' social behavior occurs, code its' frequency only (i.e. turn the toggle on and off quickly).
7. If the child is interacting with a group, and one or more nonhandicapped children are members of that group, code the interactions as with nonhandicapped.
8. If the child is actively moving about the room and pauses momentarily, use the 2 second count rule before coding as 'inactive' (this would include lying on the trampoline bed).
9. If the child is the passive partner in an activity but is using the equipment for its inherent purpose (e.g. being pulled in a wagon, riding on the back of a trike) code as 'active' with the appropriate group category.
10. If the child is hurt/upset and being attended to by an adult, code as 'unobservable' until he/she is independent of the adult.
11. Change codes from 'alone' to 'with' as soon as the child initiates an activity

near or with a group of children or another child. Terminate when the child turns his back to the group or activity for longer than the 2 second count.

12. If there is still clock time remaining, but no videotape left, immediately code as 'unobservable' until the timer stops.

Coding Rules - Study 2

1. Behavior is coded at the end of a 20 second interval, the moment the tone sounds. Follow the child during non-coding time to be sure not to lose track of his/her whereabouts.
2. Code the equipment that the child is interacting with, e.g. holding, sitting on, playing with.
3. If a child is playing with equipment that falls into two or more categories, code them all as occurring, in the same interval, e.g. ball on trampoline, incline and scooter.
4. The thin mats used as 'safety' mats under the equipment will not be considered equipment, unless they are being used as such, e.g. draped over a bench for a tunnel, or child is moving mat to change equipment.
5. If equipment category is uncertain, for any reason, note the appropriate level of activity and indicate uncertainty with a question mark at the appropriate interval spot on the recording sheet.
6. If the child has left the screen or it is unclear what he/she is doing, code as unobservable.
7. If the videotape ends before all intervals are coded, code all remaining intervals as unobservable.
8. If the child is in the act of throwing or jumping from a piece of equipment at the sound of the tone, (i.e. momentarily not in contact with equipment currently in use), code the equipment that is being used.

Operational Definitions

EQUIPMENT

Large Play Equipment: benches, inclines, platform, stairs, trampoline, boxes, bar, climbing apparatus, slide and associated apparatus, rope, ladders, donut, large foamy mats.

Small Play Equipment: hockey sticks, pucks, assorted balls, bean bags, foamy mat pillows, scoops, racquets, bats, hoops, cones, basket, skipping ropes.

Play Vehicles: tricycles, bicycles, scooters, wagons.

No Equipment

ACTIVITY LEVELS

Inactive: sitting, lying down, standing, any idle repetitive movement of body or equipment.

Moderate Activity: walk, prone progression (crawling, creeping, hitching, walking on knees), throwing, catching, striking, bouncing, pedalling, pulling, pushing, riding in/on equipment, jumping from low equipment, hanging/swinging from equipment with feet on the ground, sliding (on slide or incline), climbing.

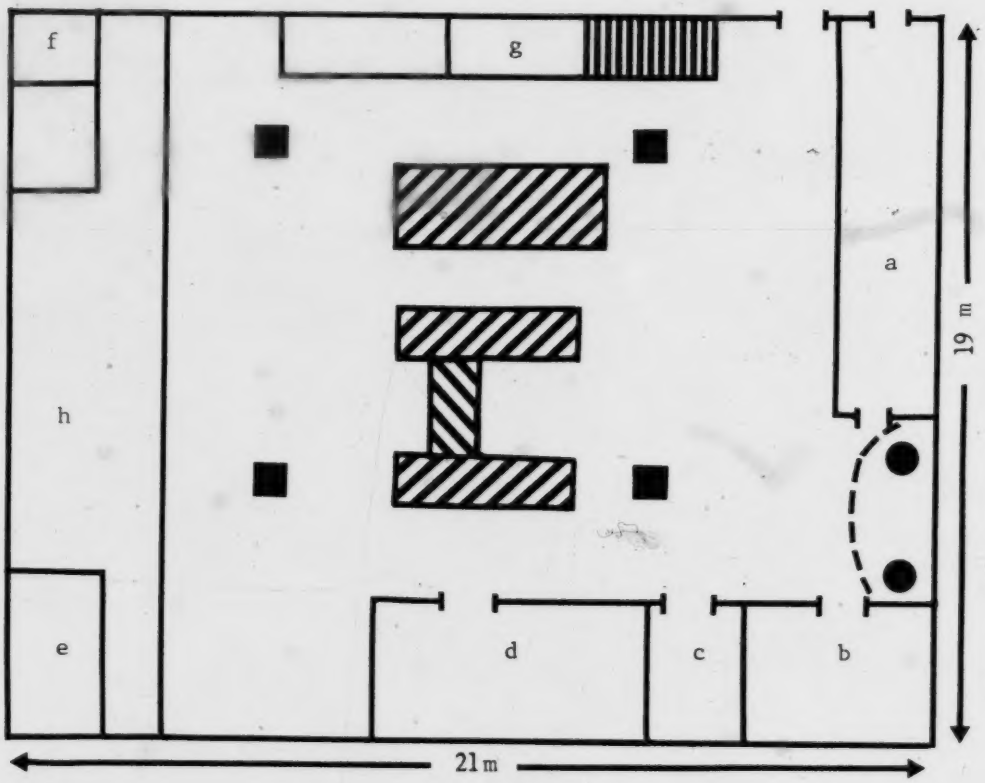
Vigorous Activity: running, wrestling, somersault, skipping, galloping, swinging/hanging from equipment with feet off ground, jumping from top of slide, jumping on trampoline, jumping from rope, rolling around bar.

Appendix B: Equipment Layout

Basic Equipment Layout

Range of Camera Span

Diagram of the basic equipment layout in the PREP playroom.



— — partial screen for camera

■ support pillar

● camera

▨ climbing apparatus

a. observation room

b. office

c. washroom

d. storage room

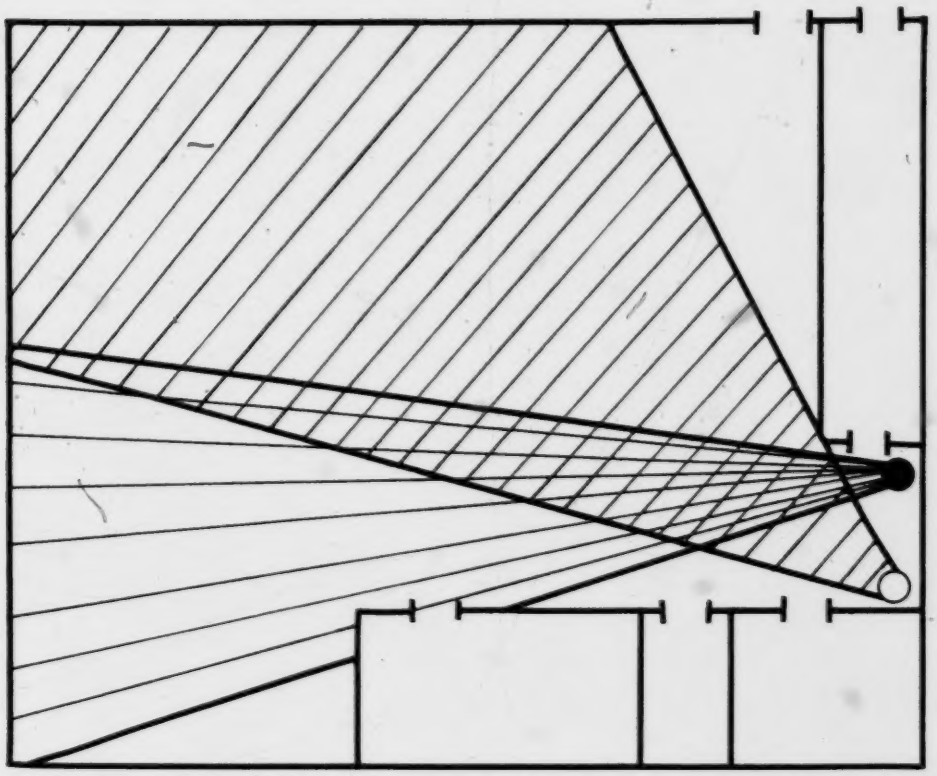
e. trampoline

f. incline

g. slide apparatus

h. large floor mat

Diagram depicting range of camera span.



● PREP Camera

○ PSA Camera

Appendix C: Data Collection Forms

General Data Coding Worksheet - Study 1

MTS Coding Sheet - Study 2

Teacher Questionnaire

General Data Coding Worksheet - Study 1

Observer Name:_____
Student:_____

Coding Date	Session Date	Tape #	Toggle #	Frequency	Duration	Range Min.	Range Max.	Duration Avg	Duration S.D.
Video Start Time: PREP:_____ PSA:_____									
Video Start Time: PREP:_____ PSA:_____									
Video Start Time: PREP:_____ PSA:_____									
Video Start Time: PREP:_____ PSA:_____									

MTS Coding Sheet - Study 2

Observer:_____
Student:_____
Tape:_____

Video Start Time PREP:_____
PSA:_____

Interval (secs)	Equipment				Activity			Unobs.
	Lg.Play	Sm.Play	P.V.	No Equip.	Inact.	Mod.	Vig.	
20								
40								
60								
80								
100								
120								
140								
160								
180								
200								
220								
240								
260								
280								
300								
320								
340								
360								
380								
400								
420								
440								
460								
480								